District B, 2013
Volume 19 Issue 2

TRIBUTARY TRIBUNE

Stories and art by the
Watershed Stewards Project

West Fork Sproul Creek

The Watershed Stewards Project's (WSP) mission is to conserve, restore, and enhance anadromous watersheds for future generations by linking education with high quality scientific practices.

A project of the California Conservation Corps, WSP is administered by CaliforniaVolunteers and sponsored by the Corporation for National and Community Service.

Photo by Nick Tedesco

The Tributary Tribune showcases the adventures, insights, and artwork of members of the Watershed Stewards Project. For nineteen years WSP has been serving communities throughout California's coastal watersheds. This issue features articles and artwork by members from Region I, District B, which extends from Fortuna to Hopland, CA.

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The Magic and Mystery of Mushrooms in the Pacific Northwest

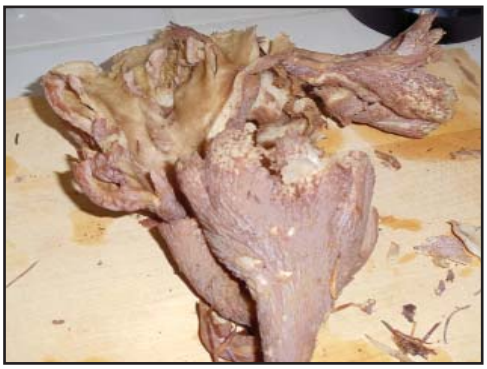
By Kate Hennessey, placed at California Conservation Corps Fortuna Center/Eel River Watershed Improvement Group

Paul Stamets bag of mushrooms: Photo by P. Stamets

Serving with the California Conservation Corps and the Eel River Watershed Improvement Group allows me to gain a wealth of experiences to better protect salmonid species. While hiking the creeks looking for places to add large woody debris or performing spawner surveys, I stumble upon several different species of mushrooms. I did not think much about mushrooms before coming to California, but now I am learning about their biological and tasty appeal.

Paul Stamets is a mushroom master, having studied them for over thirty years. Stamets found through his research that mushrooms can actually clean the soil and, in turn, water. He conducted an experiment to determine if mushrooms could clean up pollution in Sequim, Washington. Stamets and his research team grew oyster-mushroom mycelia on wood chips and then sprinkled chips on to a mound of soil soaked in diesel and other petroleum waste. They applied pollution-fighting enzymes to two other diesel soaked piles and a fourth to serve as a control. After letting the piles sit undisturbed for six weeks, Stamets found that the pile covered with oyster-mushroom mycelia produced hundreds of pounds of oyster mushrooms, while the others were lifeless and dark (Weier).

Stamets found that when fungi are introduced to a new area of soil, they send out a network of digestive enzymes. The fungi mass-produce specific enzymes that do the best job of breaking down the soil compounds. To expand on this theory, Stamets and his researchers provided fungi with just petroleum products as their only food source. The spores drew in insects, which laid eggs that became larvae. Birds that ate the larvae brought in seed. The once-polluted mound exploded with life.



Pig's Ears: Photo taken by Kate Hennessey

After his discovery of the wonder of toxin cleaning mushrooms, Stamets conducted a similar experiment to determine if soil and water could be cleaned of pollutants. To clean coliform bacteria from streams contaminated by cattle farms, Stamets placed burlap bags filled with wood chips covered in mycelia in the polluted streams. As the water seeped through the bags, the mycelia released enzymes that ate the bacteria. This method can reduce coliform bacteria up to 97 percent (Weier). These mushrooms not only clean the water and soil, but are edible too!

Being a new mushroom hunter, I am cautious about picking or eating any type I am not certain about. Carrying a guide and searching with more knowledgeable hunters, I found a few tasty varieties. Here are a couple delicious mushroom recipes:

Cream of Mushroom and Veggie Soup
by Kate Hennessey

Ingredients:
1 medium yellow onion
2 cloves garlic
1lb. wildly harvested pig's ears (Gomphus clavatus) mushrooms
2 carrots
2 crowns broccoli
3 small potatoes
1 cup heavy whipping cream or milk
1 cup vegetable broth
2 tablespoons butter
2 tablespoons flour (or more to thicken)
Pinch of salt and pepper

Directions:
1. Clean mushrooms with damp paper towel and cut into bite size pieces. 2. Melt butter and sauté garlic and veggies for 10 minutes. Add salt and pepper 3. Add mushrooms and cook for additional 2 minutes. 4. Next, add whipping cream and vegetable broth. Simmer for 20 minutes. 5. Serve when vegetables are tender but not overcooked. Enjoy! (Serves 4-6)

Crustless Mushroom Veggie Quiche
by Kate Hennessey

Ingredients:
1 small red onion
½ cup sundried tomatoes
1 cup spinach
½ lb. wildly harvested chanterelle (Cantharellus cibarius) mushrooms
3 large eggs
½ cup milk
1 cup shredded cheddar or swiss cheese
Pinch of salt, pepper, paprika

Directions:
1. Preheat oven to 400°. Grease 9x9 pie dish with butter or oil. 2. Combine eggs, milk, cheese and spices in a large bowl. 3. Chop onion, sundried tomatoes, spinach, and chanterelles. Sauté on stove for 5-7 minutes. 4. Bake for 35 minutes, or until the center is

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[1] Weier, John. "The Mushroom Messiah." Conservation Magazine. January-March 2009 (Vol 10, No. 1) Wed. 27 February 2013

The Waterlog:
My Essential Gear List for Spawner Surveys

By Toni Longley, placed at the CDFW Northcoast Watershed Improvement Center

1. Waders: They should not leak! I didn't know this when I first started wearing them and thought I was supposed to have wet socks and pants afterwards.

2. Wader Boots: I like my rubber boots, other people prefer felt, others also like to add spikes to the bottom of their boots. Falling and stumbling is inevitable.

3. Gators: At first I didn't know why these were useful. I learned they are useful because they keep loads of water from coming in the top of your boot and keep your shoe laces from getting caught on the copious flora you will be walking past.

4. Hat/Beanie/Ear Warming Head Band/Baseball Cap: Cover your head when it is cold! I LOVE my hat while I'm getting ready and at the start of the survey. After 15 minutes I am hot and sweating and the hat comes off.

5. Vest: I LOVE my vest. It holds everything and adds an extra layer of heat which is great when it is literally freezing. We'll see if it makes me too hot during summer habitat typing, maybe I'll dunk it and wear a wet vest.

6. Warm Clothes: Sweatshirt, jacket, long sleeve, T-shirt, thermal underwear - NON-COTTON, it's true, cotton sucks your warmth out when you get wet, but synthetics and wool hold much more of the heat by your body!

7. Fingerless Gloves: These are so nice when it is in the 30's and your fingers don't want to write down data or crawl over logs and rocks or write flags or handle carcasses. These will help your fingers be brave.

8. WATER: Bring at least some with you in your vest and have more in the 'rig' (at work it is a 'rig' not a 'truck'). Hydrate often! It will help you stay warm and energized.

9. Sunscreen: Somehow even when the sun isn't showing through the dense clouds, we still get sun burns.

10. Throwbag and 1st Aid kit: You wouldn't want to leave these behind! Safety first!

11. Hook: For grabbing and maneuvering carcasses. It conveniently screws onto the end of the walking stick for extra reaching power!

12. Walking Stick: This should have measurements in centimeters etched on the side so you have extra walking stability, a river probing tool so you can gauge depth and feel your way if you can't see into the water. The measurements on the side help you take data for Redds, carcasses, and visibility.

13. GPS: We need it to mark the location of the Redds and help us orientate ourselves if we need to.

14. Camera: I suggest a waterproof phone case or camera because you will see once in a lifetime sights and you will want to walk down that memory lane one day.

15. A Good Attitude: Enjoy your time! Even if you're cold, wet, hungry, and tired, enjoy your time here!

16. Lunch/Snacks: It is so nice to sit and eat your lunch while you are in the forest right next to the rivers. Also, if you are very cold, eating some food will help to make you feel warmer. In case you get lost or come upon someone very hungry it is important to have extra food.

17. Thermometers (2): One to take air temperature and one to take the water temperature.

18. Knife: To cut carcasses open to determine sex.

19. Hole puncher: To punch through the operculum of the carcasses to show other surveryors that it has been counted.

The Waterlog, cont.

20. Flagging Tape: In order to mark the Redds you write the special Redd number and other information on the flag to show other surveyors information about that Redd. It is important to tie the flag in a way that won't girdle the tree (constrict its growth) and will remain if a bear pulls part of it off.

21. Permanent Marker: Try to find ones that are OK with getting a little wet: Sharpies cease to write if there is any moisture on the flagging or if they otherwise get wet.

22. Data Sheets: You need these to gather all of the information you find to record live and dead fish as well as Redds.

23. Pencils (2): To write down your data. Bring two in case one fails because if you don't record your information it is not as helpful!

24. A Partner: Nobody in our group surveys alone not only for safety and logistical reasons but because it is important to have extra witnesses to confirm the accuracy of the data. Sometimes one person thinks "there was a Redd" and "that was a Chinook" while the other thinks, "that is scour" and "that is a Coho." It is good to discuss your observations.

25. Polarized glasses: These are amazing for cutting glare and seeing through the water. Only one person in our group had them so we handed them around to each other to see things better.

Open for Interpretation

By Scott Mullin, placed at United States Forest Service Pacific Southwest Research Station Fort Bragg

Friday Night Fights: Wild Salmon vs. Hatchery Salmon

By Nick Massa, placed at the CDFW Coastal Watershed Planning and Assessment Program

It has been 142 years since the inception of the country's first federally funded fish hatchery program. In 1871, Congress established the National Fish Hatchery System (NFHS) to support the already declining native food fish populations by rearing populations of the same species in hatcheries. The NFHS recognized the threat to wild fish populations due to natural and human causes such as flood and drought, over-harvesting, pollution, and habitat loss. They strove to remediate these effects by culturing fish in controlled environments and, eventually, releasing them back into the wild (National).

At first this seemed like a great way to help meet fisheries' management goals, appease recreational and commercial fishers, and to put fresh salmon on the plates of seafood lovers worldwide. But alas, fisheries science has improved in the past 140 years and scientists are now beginning to understand the ramifications of mixing hatchery-bred salmon with wild populations.

First, hatchery-bred fish are raised in extremely different conditions than those of their wild counterparts. Hatchery fish are typically raised in circular tanks with constant water flow and usually with much higher densities of fish than in the wild. This ultimately selects for fish that have a greater chance of surviving in hatchery-like conditions. Additionally, hatchery fish are usually bred to grow larger and quicker than wild fish, which could have implications on intraspecific competition for food and space should the hatchery-bred fish be released into the wild (Northwest).

Lastly, research has found that the larger hatchery-bred salmon will tend to prey upon the smaller wild salmon when faced with direct competition for resources. Depending on the number of fish released, this can actually edge out wild populations (Summit). A 1998 study published in the Canadian Journal of Fisheries and Aquatic Sciences shows that this is already beginning to take place – see figure 1 (Gross).

However, hatcheries are conducting some good work. They increase catch in a $3 billion Pacific salmon commercial fishing industry and are trying to offset wild fish declines due to human impacts (Summit).

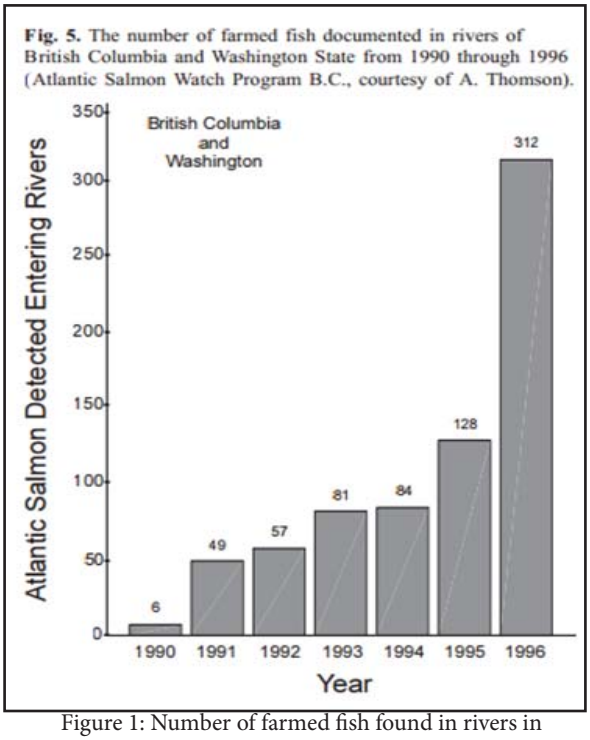

Figure 1: Number of farmed fish found in rivers in B.C. and WA State from 1990-1996

The problem is the lack of genetic diversity and altered social/behavioral traits in hatchery-bred fish. If the wide genetic array of traits exhibited by different populations and sub-populations of wild salmon are eventually consumed by a "monoculture" of farmed fish, one minor environmental disturbance could eliminate salmon forever.

While hatcheries are not all bad, there is room for improvement. Fisheries' management practices need to be improved for all to focus on maintaining healthy and diverse populations of fish. The question remains, in the heavyweight title fight between Wild Salmon and Hatchery-Raised Salmon, who will take home the belt? It may only be a short time before we find out.

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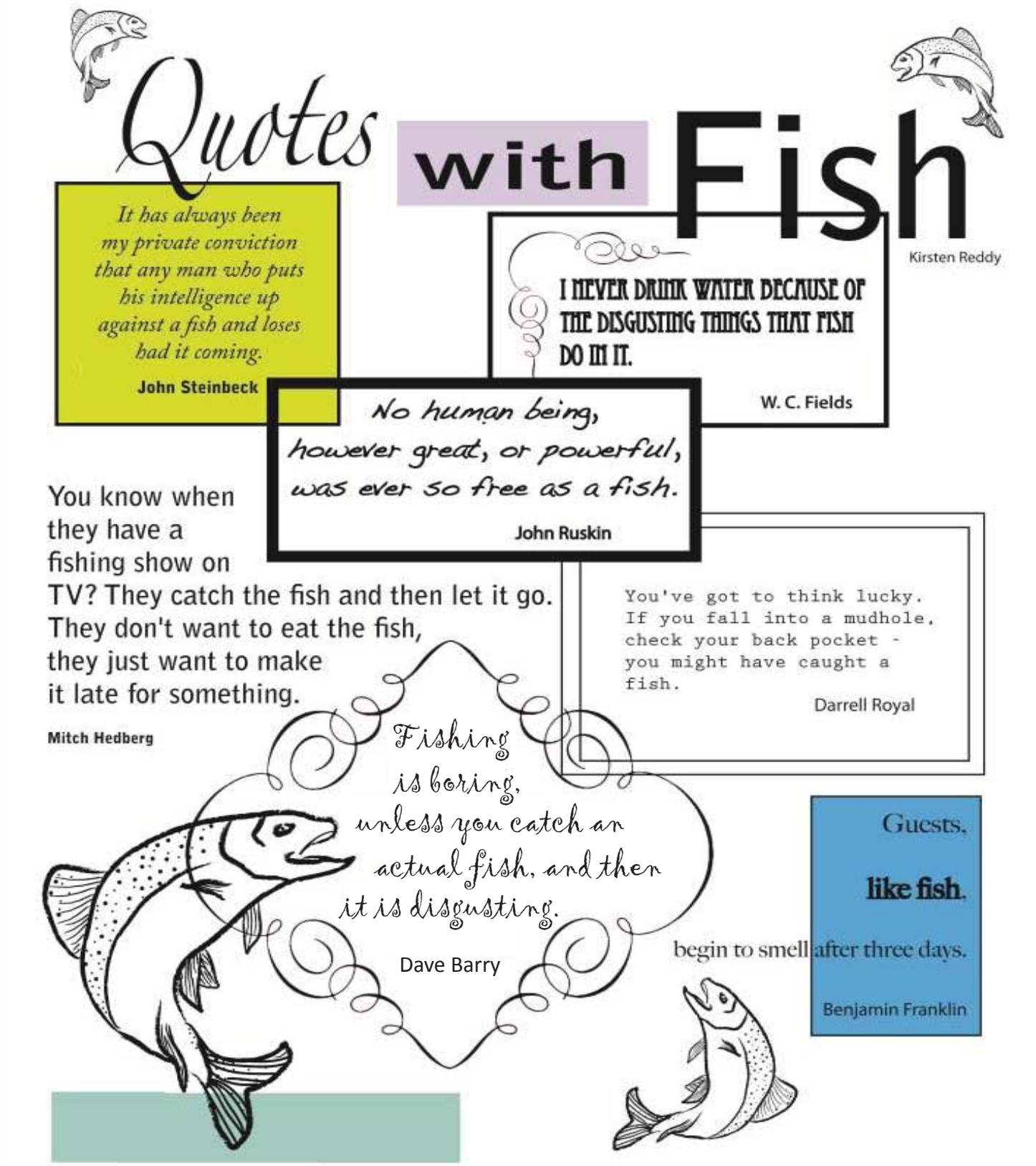
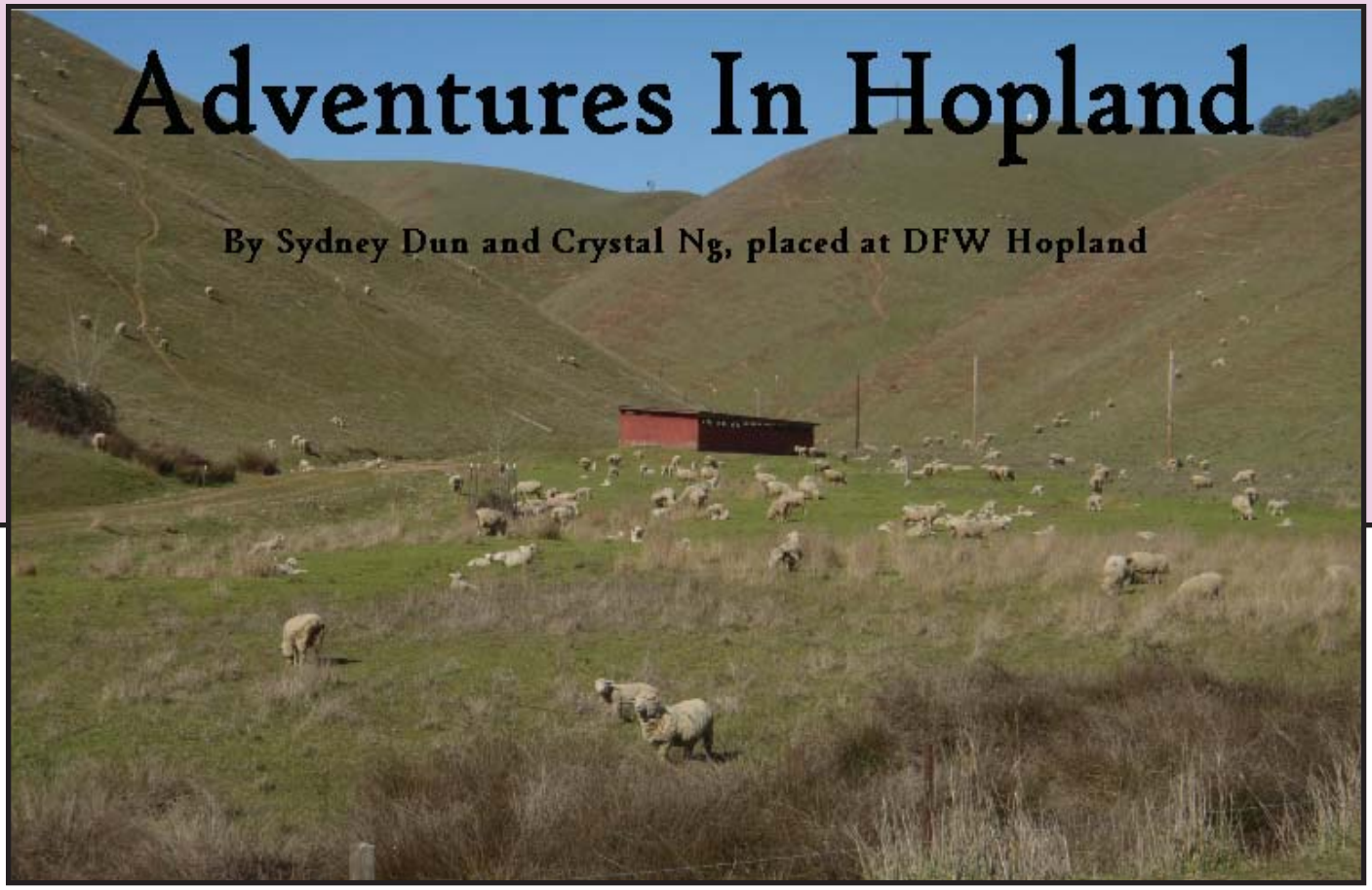
Quotes with Fish

by Kirsten Reddy, placed at CDFW Northcoast Watershed Improvement Center



Adventures In Hopland

By Sydney Dun and Crystal Ng, placed at DFW Hopland

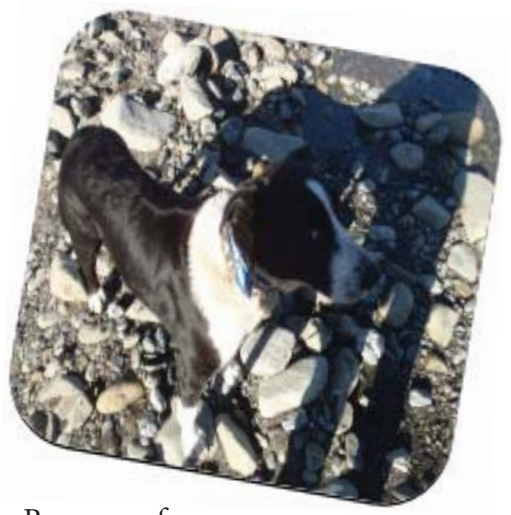


There are a lot of sheep near our office in Hopland. They can present some challenges when driving to work but mainly provide some very cute and fuzzy benefits.

These are mini horses that one of the landowners near Feliz Creek in Hopland has. They greet us every time we do a spawner survey on that reach.

We forgot to turn our lights off at the beginning of a reach. What to do?

1. Walk to the other truck parked 5 miles away.
2. Pick up some fries and BBQ sauce on the way back.
3. While you wait for the battery to charge, work on some brain teasers.



Rex, one of our companions along one of our reaches.

Tagging a carcass along Feliz Creek in Hopland.

Crystal at the Healdsburg Steelhead Festival.

One of the most important lessons of the term:
DO NOT hit a quail while driving to the office.

We work in style here at Hopland!

Straying Salmon

by Nick Tedesco, placed at the Mattole River Alliance

A 2010-2011 memo by the California Department of Fish and Wildlife (DFW) stated "Coho salmon are at low abundance levels on the Mattole River." Over the years, the coho population has declined to a point where many think the species will be lost completely from the Mattole watershed. A coho sighting is a big deal nowadays. Coho have been positively identified both live and dead, and coho carcasses have been recovered downstream of redds that were assumed to be coho redds. However, active spawning of coho salmon has not been documented in the Mattole River for four years.

During a survey in mid-January, my survey partner and I positively identified a pair of spawning coho in the upper mainstem of the Mattole River. We were elated to see spawning coho. Word spread through our crew, to locals, and eventually to CDFW. "Those coho are probably strays from the Eel River," said one anonymous biologist from CDFW.

As much as we wanted to believe that the spawning coho we saw are genetically Mattole stock, considering the low population numbers over the past many years, it is surely possible that they could be strays from the Eel River or other nearby watersheds. We will have much more information once we have their scales, otoliths, and tissue samples analyzed. However, the fact that these fish are, according to the CDFW biologist, likely strays has made me think about the importance of salmonid straying.

Philopatry is the behavior of returning, or homing, to an individual's birthplace to mate/spawn. Salmon are philopatric. Naturalists noticed that adult salmon return to their natal stream as far back as 1527, and more recent studies have proved this to be true. In the 1950s, scientists found that salmon home to their natal streams to spawn using their olfactory sense, the sense of smell. Salmon smell the chemical composition of their natal stream, and this smell is imprinted to their memory at different phases, including smolting, of their outmigration. As adults returning to spawn, salmon may travel in and out of various watersheds trying to find these imprinted scents, until they find the correct sequence of scents that takes them back to their natal stream (Quinn 2005).

Straying occurs when salmon do not return to their natal stream, and instead go to a different stream or watershed altogether. It is unclear if straying reflects a failure to home or if it is a decision to spawn elsewhere. It is clear, however, that straying has been, and will be, essential for the persistence and distribution of salmon (Quinn 2005).

This carcass was found just downstream of a redd. The caudal fin and caudal peduncal are worn and white, which is evidence that this is a digging female.

Why do salmon home?

Salmon that home have their own survival as proof that their parents' spawning grounds had conditions that were good enough for salmon to not only be spawned, but to also make it back alive (Quinn 2005). Homing results in locally specialized life history adaptations and fitness characteristics that structure populations and increase reproductive success (Curry 1994, Dittman and Quinn 1996, Hendry et al. 2004, Quinn 2005). To put it simply, if strong, large fish make it back to spawn in their natal streams, then they will make strong, large fish to make it back to spawn in their natal streams too. More specifically, salmon who survive to spawn will have survived through local habitat conditions (water quality, habitat, food, etc.) and their offspring will be genetically predisposed to survive in those same local conditions.

Why do salmon stray?

In his book, The Behavior and Ecology of Pacific Salmon & Trout, Thomas Quinn hypothesizes that strays test the suitability of different streams every year. Some streams are more stable than others. A stream that has consistent water flow and consistent habitat conditions is considered stable. A stream that has good habitat one year and poor habitat the following year is considered less stable. Quinn suggests that salmon that are reared in a stream with low stability will produce more salmon that are strays in order to increase the chances that those fish will find a more stable stream to spawn in.

Rates of straying are higher when a population is low and, likewise, rates of straying are lower when populations are high. The translocation of Chinook salmon to one river in New Zealand quickly led to unaided colonization of several other rivers within 15 years. However, the present level of straying among salmon is not high enough to account for the widespread colonization that apparently took place after the Chinook's initial introduction (Unwin and Quinn 1993). As the population increased, the rates of straying slowed. The salmon started to become specialized to their new natal streams and then they started homing at an increasing rate.

When population densities get too low, straying is a mechanism for maintaining genetic diversity (Hamann and Kennedy 2011). After generations, if salmon do not stray, the genetic makeup of a given population will be extremely similar and one virus, disease, or bacteria may have the ability to wipe out an entire population. Straying is a method for getting different genes into new populations. Salmon, using their olfactory sense, have the ability to distinguish between populations, species, sex, reproductive state, and even their own family (Brown and Brown 1996). Once a population (population A) gets too low, only members of a salmon's family are available when it comes time to spawn, and this inbreeding will weaken the genetics of the given population. I speculate that salmon, after homing and finding no suitable mates, will then stray to a different system (population B) to spawn and add different genes to the population. If a salmon from a different system (population X) strayed into population A, then they may

spawn and add different genes to the population.

Straying is important for colonizing/re-colonizing habitat. Most current populations were founded by strays since much of the present range of Pacific Salmon was glaciated 10,000 to 15,000 years ago (Quinn 2005). In Glacier Bay, Alaska, new habitat appears as glaciers recede, and new habitat is colonized as it becomes suitable for spawning. Pink salmon were inadvertently translocated into the Great Lakes, which resulted in rapid colonization of Lake Superior and other Great Lakes (Kwain 1987).

What proportion of salmon stray?

Straying varies between species and populations, Studies have provided data on the proportion of salmon that stray; however, most of these studies have been on single species. In 1984, Quinn and Fresh conducted a study that analyzed the homing/straying habits of tagged Chinook salmon in the Columbia River watershed by tagging over 1.2 million smolts. Of the initial smolts tagged, it is estimated that 41,805 returned (based on 24,139 recovered tags). They found that 98.6% of the salmon homed to the studied stream and the remaining 1.4% were strays. Of those strays, 1.7% (or 10 salmon total) went outside the Columbia River watershed, while the vast majority of the remaining strays were found near the studied stream on the Columbia River (Quinn 2005).

Little information exists on comparative straying rates among species (Quinn n.d.). However, in 1954 Shapovalov and Taft worked on a study on two coastal California creeks: Waddell and Scott creeks. This study included two species, coho salmon and steelhead, and it considered straying between the two streams. The study lasted over 7 years, and had two important conclusions: the proportion of both coho and steelhead homing to their natal stream was far more than would have been expected by chance, and a higher proportion of coho salmon strayed than steelhead.

This carcass has white gums and a black mouth. This is one way to positively identify a coho from a chinook (black mouth and gums) or a steelhead (white mouth and gums).

One of the factors which influences straying is specialization. Specialization occurs because some salmon species have stricter demands when it comes to freshwater habitat; some have complex adaptations for migration, while others migrate to the ocean relatively quickly. If salmon are highly specialized, they may be less likely to stray because they need specific conditions found in the streams where they were spawned. If specialization in freshwater is the largest factor affecting straying, the most likely species to stray would be pink and chum (relatively equal), then Chinook, coho, and finally, sockeye salmon would be least likely to stray. Another important factor to consider in straying salmon is the age at which a salmon matures. For example, all pink salmon mature at two years, while Chinook salmon mature at various ages. This varying age of maturity can be considered "straying in time" and may influence the evolutionary need to stray in space. If a cohort of pink salmon returns to spawn and find unfavorable conditions in one year, then the entire cohort could be wiped out. Since they return to spawn at varying ages, Chinook salmon cohorts have a better chance of finding favorable spawning conditions. If the age at which a salmon matures is the largest factor affecting straying, the most likely species to stray would be pink, then coho, chum, and sockeye (relatively equal), and finally Chinook (Quinn 2005).

What does it all mean?

The Mattole River is considered a low-stability system due to the active geology of the King Range (including fine sediments and mass wasting), local land use practices, and the variation of precipitation and flow levels. According to CDFW, the Mattole has a very low coho population in terms of density. Coho also have stringent habitat requirements while in fresh water. These are all strikes against the hope of recovering the coho population in the Mattole River. Looking at the research, the majority of Mattole coho will try homing back to the Mattole; however, there may be a slightly higher chance that they will stray based on the above conditions. Other river systems, like the Eel River, may need the diversity that a genetically Mattole coho brings.

WSP member Michelle Dow holding the first coho recovered on the Mattole during the 2012-2013 spawning season. The slight copper color found on this carcass is common among coho females.

Any salmon (coho or otherwise) that returns to spawn in the Mattole, are producing Mattole salmon. Their offspring will likely home back to the Mattole River to spawn as well, assuming they survive to adulthood. The Mattole needs the genetic diversity that strays bring to its river system because of its low population of coho. Those coho are probably strays from the Eel River. To this statement I say: good. We need them for a number of reasons, and they might have needed to stray from their natal river system. Straying and the ability to colonize new areas over evolutionary time is important, yet little research has been conducted on this topic (Quinn n.d.). As long as suitable habitat is protected and restored, straying gives us hope that the salmon population will recover.

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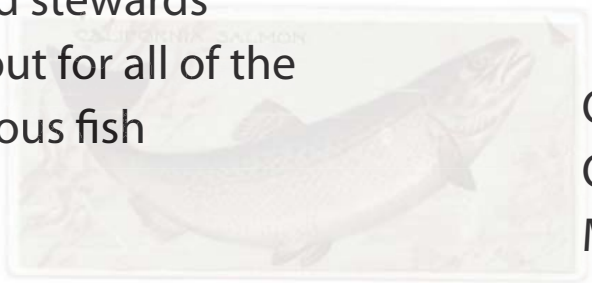
A Collection of WSP Haikus…

By Shirley Wu, placed at CDFW Coastal Restoration Monitoring and Evaluation Program

October

Watershed stewards
Looking out for all of the
Anadromous fish



November

Out of the office
On to the spawner surveys
My boots are still wet

December

If you are lucky
You'll be out in the cold field
Or is that wretched?

January

All this Humboldt rain
Remind me why again? Oh.
Right, we love nature.

February

It's nice that we have
Kids that appreciate us
And fish dissections.

March

Oh hey let's hang out
Trainings, service days, workshops
There's always more work.

April

I'm not a precog
So let's not get too ahead –
Still five months to go!

Collage

by Amanda Lightfoot-Wright, Team Leader at WSP Office, Fortuna

Cleaner Energy for a Rural Community

by Michelle Dow, placed at the Mattole River Alliance

The Mattole Restoration Council (MRC) doesn't just plant trees and stabilize banks. The council has its eyes on a cleaner energy future. The MRC plans to buy and operate a biomass processor that will produce electricity from woody materials. With more than half of the Mattole watershed residences off the grid already, the biomass generator would put the Mattole one step closer to complete autonomy from foreign fossil fuels.

Biomass is biologic material containing carbon and can be found in the form of wood, agricultural crops, and plant material. The generator works by converting biomass into energy by gasification; the material is burned in a furnace with a controlled amount of oxygen under pressure and converted into hydrogen and carbon monoxide called 'syngas.' The sygas can be run directly through a gas turbine or burned in the presence of water to produce steam. The syngas can further be processed to make liquid fuels. The conversion of biomass to fuel is deemed carbon neutral because the gasses emitted are equal to the amount absorbed by living plants.

GEK Power Pallet

The gasifier the MRC is looking into purchasing, called the solar pallet by ALL Power Labs, looks like a base of engines with a keg on top.It is composed of a 4-cylinder engine, an industrial generator, a multi scale "downdraft" gasifier and a process control unit (PCU). The PCU is an automated control board that moniters all internal reactions such as engine and filter conditions, oxygen content, and it displays the information on an LCD screen. On top of the engine is a hopper where the feedstock is loaded into the gasifier, which can hold up to 10 hours of fuel. The impressively small system measures 1.2m x 1.3m x 1.8m (51"x 52"x 72") and can generate up to 20kilowatts(kW) of power while consuming 50lbs of biomass per hour. To put it in perspective, during a 24-hour period the gasifier can consume 952lbs of materials and put out 360 kilowatt-hours (kWh) of power. The average annual electricity consumption for a U.S. residential utility customer was 11,496 kWh, at an average of 958 kWh per month or 39 kWh per day (U.S. Energy Information Admin.). Assuming that the average Mattolian uses as much power as the average American, the solar pallet can power 9.2 houses a day. The hope is that the solar pallet would power the Mattole Valley Community Center and a handful of surrounding houses.

The solar pallet runs best on chunky, dry, carbon -dense, hard wood chips but can tolerate soft wood chips, nut shells, saw dust, coffee grounds, corn cobs and manure. Here in the Mattole, the feedstock would come from byproducts of fuels reduction and invasive removal projects, including limbed trees, down trees, forestry thinning, excess mill ends from small-scale timber harvests, animal manure, and other household wastes. The feedstock would be chipped and loaded into the hopper at 10-hour intervals. The costs range from 0.02-0.05 cents per kWh and are significantly cheaper when compared to diesel at 0.35-0.50 cents per kWh. The benefits of a biomass generator are that it provides energy when you want it (not only when the sun is shining or wind blowing) and that it uses byproducts of restoration projects in the watershed. Hezekiah Allen, the MRC Executive Director, of the MRC plans to loan out the generator to the Schatz Energy Resource Center at HSU so they can examine and critique it fully before operation.

The idea of a small, rural community creating auonomy from fossil fuel dependence is exciting and feasible. Additional costs after the initial purchase (the pallet costs around $28,000) include organizing a series of workshops for the community to understand and witness how the generator works. Some concerns arise with the generator: the importance of biochar being left on site to recycle nutrients post-fire, transportation costs using fossil fuels to feed the generator (the pallet weighs 1700lbs, making transport feasible if cumbersome), and grid technology noteing up-to-date with syngas buy-back. Ideally, a best management practice would be implemented to ensure that biomass harvest is done in a sustainable way. Carbon neutrality is a dream for the watershed, and in the future I imagine the community coming together to donate mill ends and tree limbs so we can all watch cabarets at the community center with lighting and heat powered by local sources.

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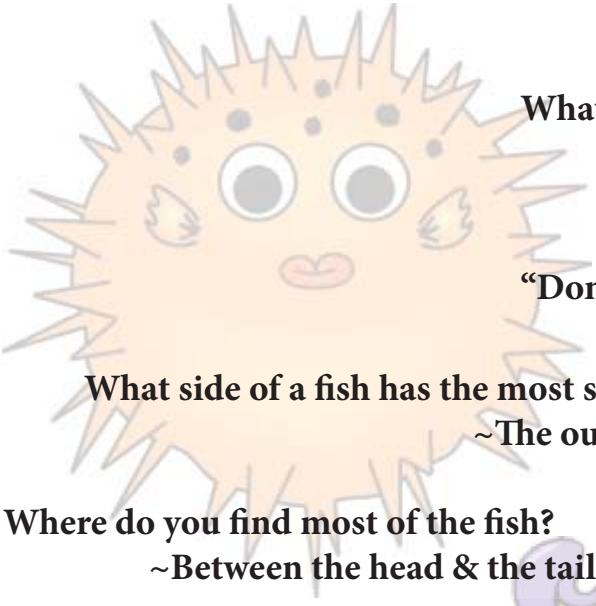
Fishy Humor

by Rachael Iverson, placed at the CDFW Northcoast Watershed Improvement Center

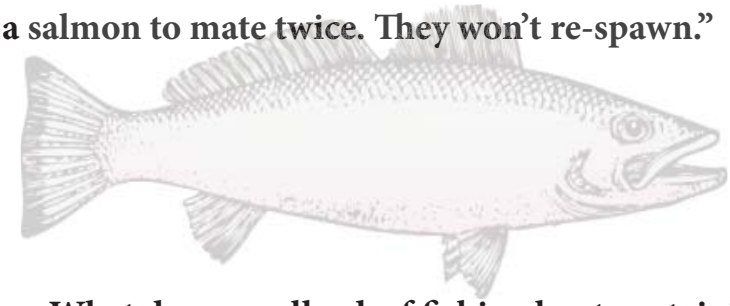


What do you call a fish with no eyes? ~Fsh!

What day of the week do fish hate? ~Frydays

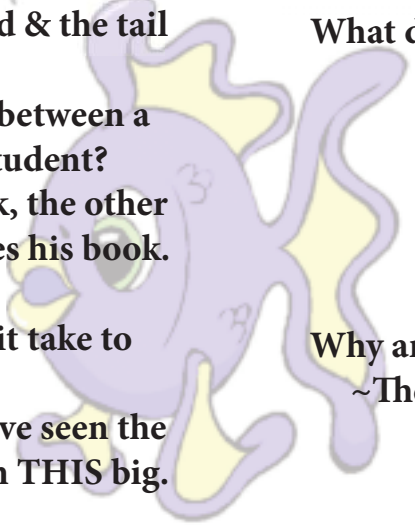
What do you call a fish with two eyes? ~FIISH

"Don't ask a salmon to mate twice. They won't re-spawn."



What side of a fish has the most scales?
~The outside

Where do you find most of the fish?
~Between the head & the tail



What is the difference between a fisherman and a lazy student?
~One baits his hook, the other hates his book.

How many fishermen does it take to change a light bulb?
~One, but you should have seen the bulb; it must have been THIS big.

Have you seen the new fishing website?
~ No, it's not online yet.

What kind of money do fishermen make?
~Net profits

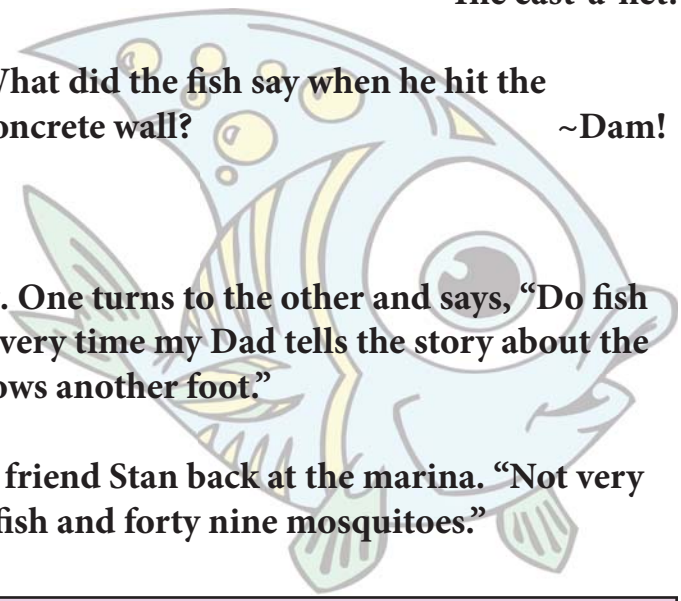
What do you call a deaf fishing boat captain?
~Anything you like, he can't hear you.

What is the difference between a fish and a piano?
~You can't tuna fish.

Why are fish no good at tennis?
~They don't like to get too close to the net.

What kind of musical instrument can you use for fishing?
~The cast-a-net.

What did the fish say when he hit the concrete wall? ~Dam!



Two boys were sitting on the rivers edge fishing. One turns to the other and says, "Do fish grow fast?" The other boy replies, "I think so. Every time my Dad tells the story about the one that got away it grows another foot."

"How was the fishing today Adrian?" asked his friend Stan back at the marina. "Not very good I only got fifty bites; one small fish and forty nine mosquitoes."

Photographs by Brian Starks, placed at CDFW Northcoast Watershed Improvement Center

A frozen tributary to Cañon Creek, off the Mad River. Yes, it was quite cold that morning.

Fabulous Coho. Nice coloration, huh?

Left: Beautiful West Fork Sproul Creek, tributary to the South Fork Eel River. Easily my favorite survey reach. The colors of the creek changed all throughout the winter.

Right: Bear tracks on Cañon Creek! Never saw a live one though.

Left: The most amazing log debris accumulation (LDA) at the end of Stevens Creek, off the Van Duzen River. This picture doesn't do it justice, but this thing has a huge waterfall behind all that wood, plus another two levels of woody debris above what you can see here. Best end of anadromy ever!

Creekwalker

by Ericka Augustyn, placed at CDFW Coastal Watershed Planning and Assessment Program

Creekwalker sliding down a log jam
Cross your fingers, hope that you land
Bad dogs, ripping down the fence post
Who knows what they're gonna do

Water poured across the bedrock
Little Coho travelled from the ocean
Mate-less, beat to death or spawned out
Tail-less, gnarly and fungal

Oh, fish I feel for you
My feet are so wet for you, oh

Your knees are aching with a lot of pain
Icy Hot is calling your name
Old carcass rotting on the right bank
Plug your nose cause it really stanks

Little bear caught yourself a snack
Give it back, she needs a jaw tag
Tiny hole, won't find no evidence
Aquaseal, pray that it mends

Oh, fish I feel for you
Spawned out, what can I do?

Oh, Let me see, the GPS please
We're on the wrong creek
Oh, Let me see, the GPS please
We're on the wrong creek

Underwater, the Eel River Casanova
Underwater, the redd-building Queen
She shook, depositing her pink eggs
He shook, fertilization

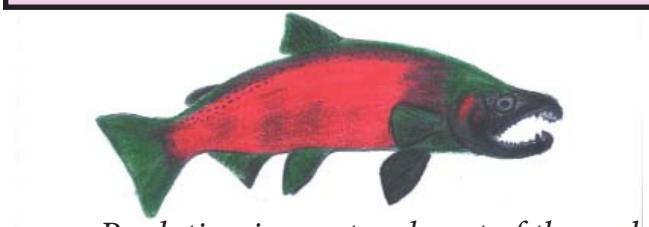
It's a thrill to see and watch Coho
There's a special place on the creek for me
Oh man, I just gotta do something
To make this keep happening

Oh, Let me see, the GPS please
We're on the wrong creek
Oh, Let me see, the GPS please
We're on the wrong creek

Oh, Let me see the GPS please
We're on the wrong creek

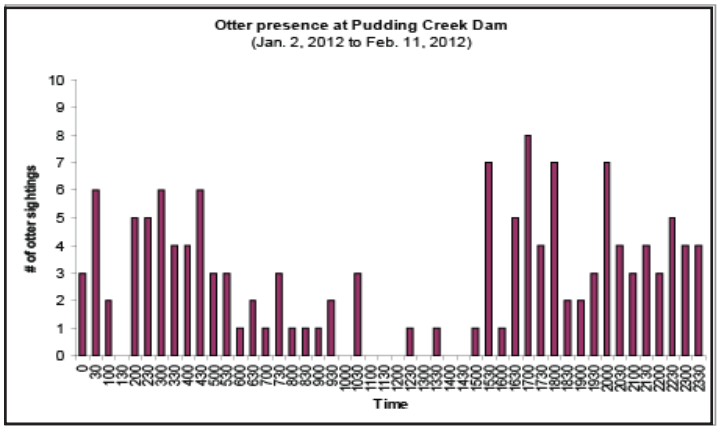
To Catch a Predator

by Joe Brady, placed at CDFW Fort Bragg

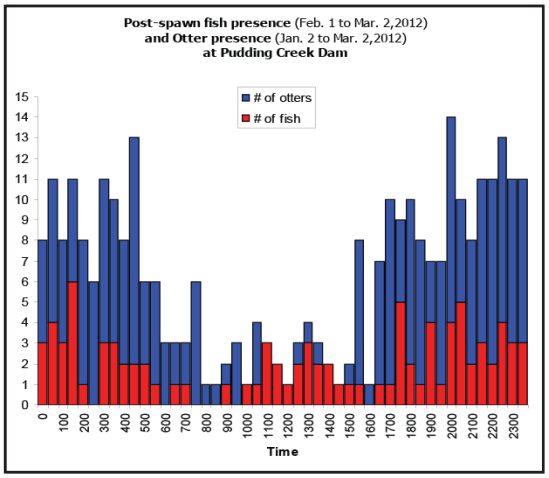


Predation is a natural part of the cycle of nature. There are a multitude of native species that we encounter in the field who rely upon sea life as one of their main sources of sustenance. North American sea otters, black bears, ospreys, bald eagles, California sea lions, and American dippers are all examples of predators that feed on our endangered salmonids. When spawning season arrives and the wild coho salmon and steelhead trout enter our streams to spawn, a veritable buffet is created for these creatures to feast upon. A century ago this would not have caused too much of an impact on the overall population of spawning salmonids; however, in the last fifty years the cumulative effects of all human-induced environmental impacts, including over-fishing, has so depressed the populations of coho and steelhead that even factors such as natural predation have taken on critical significance.

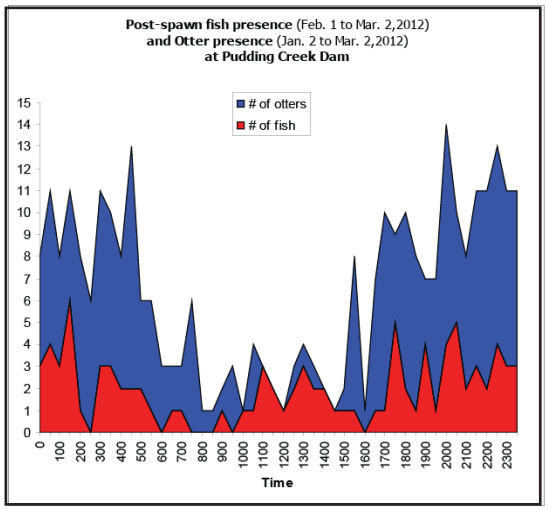
Here in Fort Bragg on the Mendocino coast, the California Department of Fish and Wildlife has partnered with Campbell Timberland Management to install a DIDSON, or Dual-Frequency Identification Sonar, on Pudding Creek just north of town. The purpose of this acoustic camera is to count salmonids bypassing the fish ladder and evaluate counts relative to independent recapture experiments. The DIDSON was installed on a concrete apron just above the Pudding Creek dam and data is recorded continuously. All data files are reviewed for the presence or absence of migrating fish. Since the camera has been running, we have found natural predators, especially river otters, frequenting the dam and pursuing post-spawn steelhead and coho. The graphs to the right show the time of day that the otters most often visit Pudding Creek and potentially prey on salmonids. Using the DIDSON data, we recently recognized the appropriate times to release post-spawn fish, which has greatly helped to reduce otter-induced fish mortality.



This graph displays the presence of otters corresponding with the time of day monitored at Pudding Creek dam.



This graph compares the presence of post-spawn salmonids and river otter presence at Pudding Creek dam.



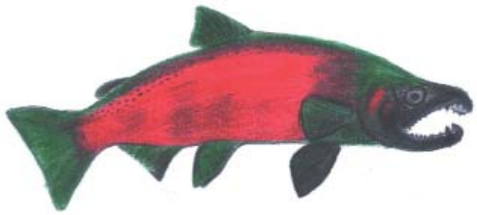
This graph gives another perspective of post-spawn fish presence compared to that of river otters at Pudding Creek dam.

There are some other interesting measures of deterring predators from cutting down salmonid populations that have been put into effect, especially in the Pacific Northwest. At the Bonneville Dam on the Columbia River bordering Oregon and Washington, there has been an immense increase in the population of California sea lions preying on spawning salmonids. Sea lions eat thousands of salmon and steelhead populations each year while the fish are waiting to enter the ladders at Bonneville Dam. In order to protect endangered salmon and steelhead populations, officials authorized the use of non-lethal means to scare away the sea lions. Boat-based hazers would use a combination of acoustic and tactile deterrents, such as seal bombs, cracker shells, and rubber buckshot, to deter the sea lions from the fish ladder. While this treatment was somewhat effective, the problem persisted. In 2008 the federal government gave fish and wildlife officials permission to kill up to 85 sea lions each year below Bonneville Dam in order to control the population. The states try to relocate the marine mammals to aquariums and zoos when possible; however, the decision to kill one species to protect another has caused a bit of an uproar by the Humane Society and other animal advocacy groups. As they see it, sea lions are not as big a threat to salmon as other factors, such as over-fishing by humans.

Year	Salmon/steelhead Runs*	Sea Lion Predation	Predation as % of Run
2002	284,733	1,010	0.4%
2003	217,185	2,329	1.1%
2004	186,804	3,533	1.9%
2005	82,006	2,920	3.4%
2006	105,063	3,023	2.8%
2007	88,474	3,859	4.2%
2008	147,543	4,466	2.9%
2009	186,060	4,489	2.4%
2010	267,194	6,081	2.2%
2011	223,380	3,557	1.8%

Another example of predation control on the Columbia is the contracting of bounty hunters to fish out the increasing pikeminnow populations threatening juvenile salmon. Hatcheries release large quantities of juveniles into the water at once. The salmon often get disoriented after passing through the fish ladders at the dams and fall victim to pikeminnow, which wait below the dam and feed on the salmon as they pass through. In 1991, the Northern Pikeminnow Management Program was implemented and began paying bounty hunters to fish for pikeminnow about eight dollars per fish in order to protect endangered salmon species. As a result of the program, more than 3 million pikeminnow have been removed from the Columbia and Snake Rivers and the amount of juvenile salmon and steelhead consumed by pikeminnow has decreased by 50%.

It is clear to see the increasing problem that predation has caused in the natal streams of upstream migrating salmonids. With salmon and trout populations continuing to dwindle, biologists have to be creative to combat this issue. Surprisingly in Mendocino County we have been seeing a much welcomed spike in populations, especially steelhead, in our monitored streams from Garcia River to Usal Creek. Once our life cycle monitoring for this season comes to a close and our data is processed, it will be interesting to see how much of a comeback our native salmonids have made compared to previous years.



Works Cited:

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How to Build Your Own Fish Cradle!

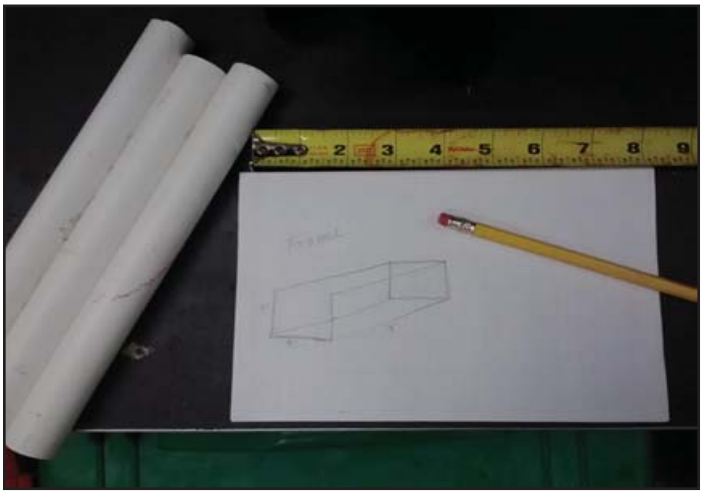
by Nicolet Houtz, placed at CDFW Fort Bragg

The purpose of the fish cradle is to keep the fish secure and calm when we capture them out at our weir. They will struggle and flop around, making it difficult to hold on to the fish while trying to tag them, get a measurement, and take scale samples. The cradle is designed to allow water to flow through and it has a flap to keep the fish's head covered. When a fish's head is covered, it thinks it is hiding and will calm down.

Materials:

10 feet of ¾ inch PVC pipe
6 side outlet elbows, ¾ inch
2 elbows, ¾ inch
PVC Primer
PVC glue
PVC Cutters
Zip ties
Cutting Board
1 square yard of Canvas
6 x 6 inch mesh square
Upholstery thread

Part 1: Construct the Frame



1. Cut your PVC pipe with the pipe cutters into four 33-inch sections, four 7-inch sections, and three 9-inch sections.

2. Build one end of the frame by using four of the side outlet elbows to glue together two 7 inch and two 9 inch PVC pieces to form a rectangle. The 9 inch sides are horizontal, 7 inch vertical.

3. Once the rectangle is built, glue the four 33 inch PVC pipes into the side outlet elbows.

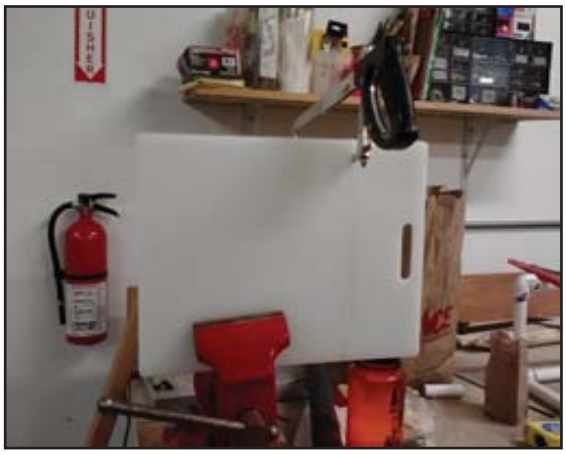
4. Complete the frame by building the end piece. Glue two side outlet elbows to either end of the last 9 inch (horizontal) PVC pipe.

5. Now attach two 7 inch (vertical) PVC pipes, parallel to each other, to the side outlet elbows you have just glued to the 9 inch PVC pipe to form a "U" shape.

6. The 9 inch pipe will be the base, with the 7 inch pipe as the height.

7. Glue the base of the "U" shaped end piece to two of the 33 inch pipes.

8. Do not glue the top arms to the end of the "U" frame. Leave this open so that, once the canvas sling is finished, you can slide it onto these arms.



9. Using a hack saw or table saw, cut the cutting board into a rectangle to fit the end of the cradle frame.

10. Drill holes around the edge of the cutting board and use the zip ties to tie it to the end of the frame.

Part Two: Sew the Sling

11. Cut canvas to fit the frame. Be sure to leave about 6 inches of extra fabric on either side.

12. Sew loops onto either end of the canvas to slide onto the top of the frame.

13. Place the mesh roughly a third from the end of the sling, sew around the edges, and cut out the canvas on the inside to expose the mesh. This is for water drainage.

14. Sew a piece of canvas 12 inches x 8 inches to the top third of the sling above the mesh patch. This is used to keep the fish's head covered in order to keep the fish calm while in the sling.

15. Slide the completed sling onto the top two 33 inch PVC pipes and glue these two pipes into the two elbows .

From the Bones Brings New Life

by Crystal Ng and Sydney Dun, placed at CDFW Hopland

The first winter storm at Hopland brought with it the freedom from the monotony of office work and the independence to create our own work schedule. For weeks we had anticipated starting spawner surveys on Feliz Creek where a dam was just removed. There was excitement in the office since it was the first winter after its removal. There was also a lot of speculation about the possible effects of sediment load on fish movement. When we finally got our feet wet, we fortunately started noticing salmonids and redds throughout the main stem of Feliz Creek; however, we also encountered some problems as the season progressed.

With spawner surveys as the focus of the winter season, we spent the majority of our weekdays walking through the stream. In the beginning, one of the challenges we faced was simply figuring out how to conduct spawner surveys efficiently and accurately. This was new to both of us and questions arose in the process even with the training we received. However, we quickly learned that most of the answers to our questions came with experience. Other answers we had to actively pursue by asking our mentors or the scientific aid, a year 18 WSP alum, at the site.

We faced other challenges in our field work too. We encountered dense thickets of blackberrie that we had to crawl through to avoid deep parts of the creek and this led to torn and leaky waders. We also could not anticipate the felt soles of our boots being sucked off into a mucky abyss.

Our solution to all these challenges was to work with the resources we had to "get things done." While leaky waders and sole-less boots were temporary problems, the largest challenge faced this season was the lack of rain starting in December. This meant few fish. As weeks passed, a certain level of monotony surrounding spawner surveys set in as we repeated the same three reaches throughout the season to monitor the effects of the dam removal.

As the winter rains died out and the reaches became more familiar, we started to look at more of the area along the banks and the hillsides. One of our most common observations was several types of bones scattered on the banks throughout Feliz Creek. Given both of our backgrounds in biology, we jokingly suggested to collect as

The two skulls used to make the Chupacabra are from a black-tailed deer found on Feliz Creek and a sheep found near our office in Hopland.

many bones as possible to recreate a creature's skeleton. It wasn't until later that the scientific aide at our site told us about the legend of the Chupacabra. Because we also noticed that the bones along the creek did not belong to any one animal, it suddenly made sense to recreate a mythological creature with a chimeric body.

Similar to the spawner surveys, we began encountering problems when constructing our Chupacabra skeleton. One of the first challenges we faced was design of our Chupacabra. While both of us are familiar with human anatomy, a quadruped's skeleton is arranged differently. To complicate the situation, many of our bones were different sizes. In the end, our pursuit of answers paralleled the way we sought answers to spawner surveys questions: asking people who were well-versed in the subject.

The lack of rain affecting spawner surveys also affected the diversity of bones we encountered. Since there was no rain to wash bones downhill to the creek banks, many of the bones we found often belonged to the same species or were the same type of bone. (We never ended up finding a hip bone!)

Also while designing our creature we encountered the problem of limited resources. At our disposal were wood scraps, chicken wire, a saw, about 30 nails, and wire clippers. We quickly realized that added support was extremely important, and we worked with what we had to create a wooden frame to support the bones. Once we completed the Chupacabra, we felt an immense feeling of accomplishment.

A work in progress.

The highlight of both experiences, conducting spawner surveys and building the Chupacabra, was the chance to bond as site partners. Spawner surveys gave us a chance to laugh with each other, but more importantly, laugh at each other. And, let's face it: collecting bones to recreate a mythological character is pretty dorky. Through it all, we have been presented with opportunities to build character, grow, and learn more about each other.

Another view of our Chupacabra, fittingly named "Chupee".

What WSP Means to Me

by Sarah Gossman, placed at Pacific Southwest Redwood Science Lab

I was California bound like so many others before me after successfully interviewing with Kristin Kovacs, Project Manager. I was not looking for gold or oil; I came seeking salmon. I bought a car, drove it from Minnesota to Fortuna, spent a week making 54 new friends, and spent the next ten and a half months having the time of my life.

I was a bit hesitant about coming to California alone. How could I have known that WSP would introduce me to some of my very best friends? When I got to orientation I knew I had found the right place. I walked in and there were tables of people making small talk about backpacking, plants, salmon, and river rafting. These were the people that I had come to know and love.

As you may know, California is not near Minnesota, and it is real work to make the journey back and forth. I have spent the last two Thanksgivings and Christmases, not with my family, but with friends made through WSP. In my two years with the program I have developed countless connections and friendships, and I am so thankful for it. I know that WSP's mission is to "conserve, restore, and enhance anadromous watersheds for future generations by linking education with high-quality scientific practices," but it has become so much more to me.

The Circle of Life

by Andrea Garcia, placed at the CDFW Coastal Restoration Monitoring and Evaluation Program

FISH FOOD

Edible Fish Bones Recipe

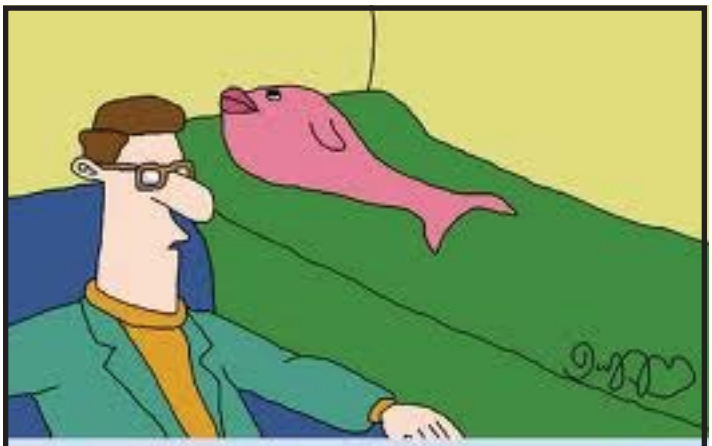
Ingredients:

Canola oil for frying

1 red snapper skeleton sprinkled with salt and pepper

How to:

Using a deep pan, pour in enough oil so that the bones will be submerged about ¾ of the way while the fish is in the pan. Heat the oil on high. Once hot, gently place the bones in the pan, avoiding splashing oil. Fry for about five minutes or so. Try not to touch the frying fish too much as it will break apart. Adjust temperature up or down depending on how it's going. You don't want to burn the fish but it won't fry properly if too cool. Using a tong, turn fish to fry the other side for about 4 minutes more. Remove from oil to a plate lined with paper towels. Let it cool a bit. Serve it as an appetizer with wedges of lime.



"Perhaps if you swam downstream life would be a little bit easier"

Winning February caption submitted by Michele Montgomery

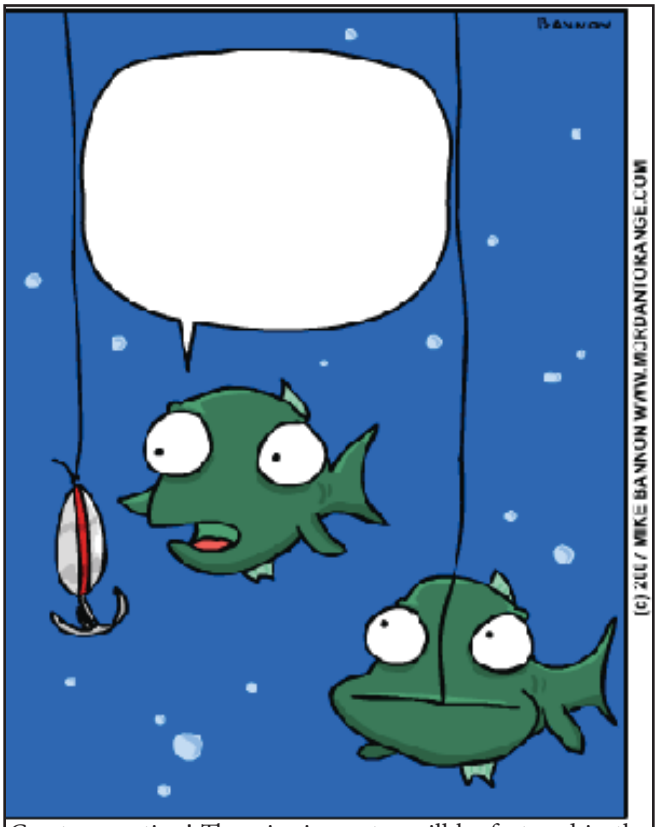
A Tricky Catch Brainteaser

Three men on a fishing trip stopped by a river and fished until darkness. They put their catch in a bucket, had a quick meal and went to sleep.

When one of the fishermen woke up early next morning, the other two were still asleep. He counted the fish in the bucket, realized that the number could not be divided by three, threw one fish back into the river, took one third of what was left, and left quietly.

When the second man woke up, he did not notice that the first one was already gone. So, he counted the fish, saw the number was not divisible by three, threw one fish into the river and left with his "third".

Believe it or not, the same thing happened to the third fisherman. Upon waking up, he did not notice that the other two had already left, so he counted the fish, threw one fish into the river, took one third of the remaining fish and went home. How many fish were originally in the bucket? (Find the smallest possible answer.)



Create a caption! The winning entry will be featured in the June edition of the Tributary Tribune. Please send all entries to Elizabeth.Montgomery@ccc.ca.gov

February Brainteaser Solution

The German has the fish and drinks coffee in the green house, which is fourth on the block.

Watershed Stewards Project

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