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TRIBUTARY RIBUNE



Stories and art by the
AmeriCorps Watershed Stewards Project



Wooley Creek Photo by Margret Zee



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.



The Tributary Tribune showcases the adventures, insights, and art of members of the AmeriCorps Watershed Stewards Project. For eighteen years the WSP has been serving communities throughout California’s coastal watersheds. This issue features articles and artwork by members from our northernmost region, IA, which extends from Yreka to Eureka, CA.

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Contents

American Dipper: Great Bird, or Greatest Bird? - Jen Olson	3
Important Lessons Learned While Conducting Spawner Surveys - David Snyder	4
Salmon Romance - Sophie Price	5
River Fun in the Mountain Sun - Margaret Zee	5
Surveys in the Snow - Damien Hawley-Jones	6
Managing Conflict in the Klamath Watershed - Kristen Sellmer	8
One Fish, Two Fish - James Peterson	9
Oh, the Places You’ll Go - Sara Tanis	10
How Do They Know? - Adam Cockrill	12
My First Snorkel Survey - Alexa Andis	14
The Awesome Apex Bar Jam - Patrick Fox	15
The Death of a Salmon - Connor McIntee	16
Weir Log 12/21/12: The End of the World - Christopher Jaster	17
There and Back Again, A Salmon’s Tale - Dale Boerman	18
A Must Read for Salmon Enthusiasts - Rebecca Swanz	19
Klamath Estuary - Kathleen Torso	20
Wader Work Out - Katie Oldknow	21
Fish Food	22

The American Dipper: Great Bird, or the Greatest Bird?

By Jen Olson, placed at the Department of Fish & Wildlife Eureka

"He is a singularly joyous and lovable little fellow, about the size of a robin, clad in a plain waterproof suit of bluish gray, with a tinge of chocolate on the head and shoulders." -The Mountains of California, by John Muir (1894). Chapter 13, "The Water Ouzel".



Spawner survey season brings a great opportunity to observe one of the most interesting songbirds in North America: the American Dipper. Also known as the "Water Ouzel", these small, nondescript gray birds can be easy to ignore as you make your way up the stream. However, if you pay close attention you'll begin to see them everywhere: bobbing up and down on rocks, swimming in pools and riffles, and whizzing past you to dive into the water in search of prey. If you listen carefully you may hear a dipper before you see it, since their sharp flight call and melodic trilling songs are both loud enough to carry over the rushing water.

Dippers are ubiquitous on many of the rivers and streams in Northern California, and they're also closely tied to the salmon life cycle. Their diet consists primarily of macroinvertebrates, whose numbers are strongly influenced by the seasonal deposition of nutrients via spawning salmon. Dippers also prey directly upon the eggs and fry of salmonids and other fish species. There is evidence to suggest that this is an important source of nutrients for dippers during their nestling period. One study in southeast Alaska showed that young dippers whose parents fed them salmon eggs and fry had a larger body mass upon fledging than young dippers in streams with fewer or no salmon (Obermeyer et al 2006). Because their role as a predator of salmonids isn't particularly well studied, especially in our area, the Humboldt and

Smith River spawner survey crews make observations about dippers whenever we encounter them by taking GPS points of single birds as well as noting potential territory boundaries when we see multiple birds.

Besides their obvious connection to the fish we study, dippers are fascinating on their own. As the only truly aquatic passerine, they have some amazing adaptations which are unique in the songbird world. Dippers are able to swim underwater for 15-30 seconds at a time. They also have special nasal flaps to keep water out and a nictitating membrane which allows them to see underwater. In order to stay warm in frigid stream temperatures, dippers have a thick layer of downy feathers and even have feathered eyelids! The added weight of this downy undercoat has been used to explain the evolution of the dipper's molt strategy. Most songbirds molt just a few flight feathers at a time and are able to retain the ability to fly while molting, but the American Dipper does not follow this pattern. It has been suggested that because dippers carry so much extra insulation, they are too heavy to molt even a few flight feathers and still be able to fly. It is possible that because of this extra weight, dippers have evolved a "catastrophic" molt strategy which has also been observed in many species of ducks. While undergoing this molt they shed

nearly all of their flight feathers at once, rendering them unable to fly for a brief period (4-14 days) during the late summer. During this time, they become extremely secretive and tend to hide in log jams or under root tangles.

Despite everything we know about dippers, we still aren't sure why they exhibit the characteristic behavior that gives them their name. Dippers "dip" (bob up and down) almost constantly, and several theories have been proposed to explain why. It's possible that this movement enhances their vision and spatial awareness in a moving stream environment and could help them to locate prey more effectively. Dipping may also be used as a way to establish territory boundaries or as a way to communicate fitness to a potential mate. Whatever the reason, this behavior is an easy way to identify dippers from afar, and--coupled with their unique swimming ability--makes them one of my favorite birds to observe while conducting spawner surveys.

American Dipper and fledgling, Lassen Volcanic National Park. Photo by Dan Barton



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Top 12 Important Lessons Learned While Conducting Spawner Surveys!

By David Snyder, placed at the US Forest Service Supervisor's Office Eureka

12) Don't forget to text your mentor to reassure them you made it safely back to the office at the end of the day. You wouldn't want them to be worried about you after it gets dark.

11) Make sure your machete is sharp when processing salmon carcasses. No one wants to repeatedly hack away at a rotting fish!

10) Keep track of government issued equipment such as GPS, cameras, and thermometers. Make sure you mark everything with bright flagging so that if it does fall into the stream, you have a chance of finding it.



9) Keep an eye out for any blocked culverts, stream crossings, or water going over the roadway while driving to and from your reaches. Do your part to limit upslope erosion that can lower water quality and degrade fish habitat. STORM PATROL!



8) Don't run away from a single little ol' bear!

7) When processing a fish, make sure to cut away from your body to prevent injuries and to avoid receiving a face full of fish guts.

6) Mark each redd with enough flagging to avoid having curious bears accidentally eat your valuable data.

5) Always watch your footing and avoid potential redds when walking through a creek. You wouldn't want to be responsible for the death of thousands of baby fish, right?

4) Don't venture into water that someone has already determined too

deep to cross. Find another way around, and don't top your waders!

3) Accept, embrace, and love the rain!!!

2) Don't touch POISON OAK!!! You'll look as though you have gone a few rounds with an MMA fighter!

1) Don't wear Carhartt's over your waders while conducting spawner surveys. It'll add a ton of extra weight and make you look ridiculous.



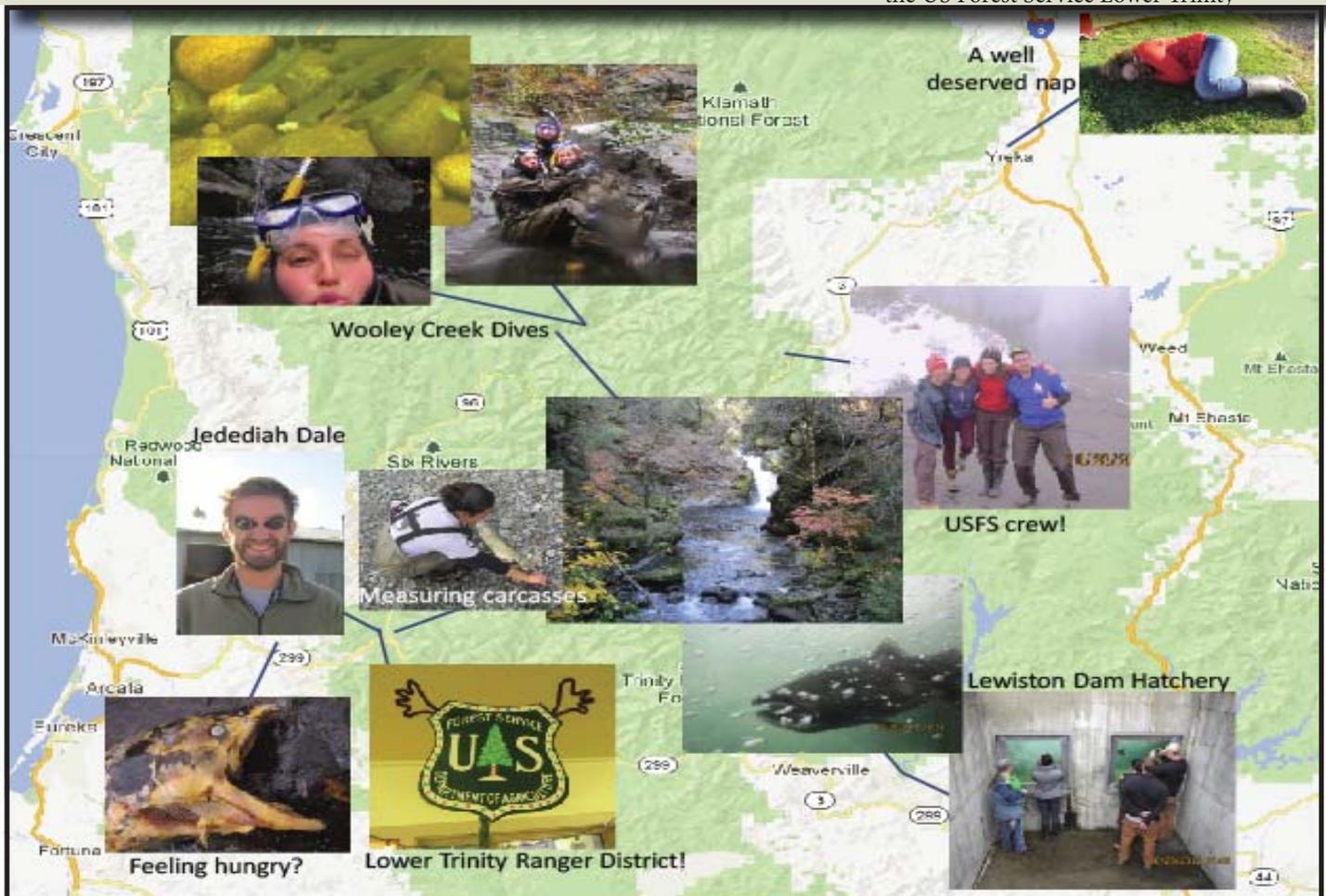
Salmon Roe-mance

By Sophie Price, placed at the US Forest Service Lower Trinity



River Fun in the Mountain Sun

By Margaret Zee, placed at the US Forest Service Lower Trinity



SURVEYS IN THE SNOW

By Damien Hawley-Jones, placed at the US Forest Service Orleans



We found ourselves at Bear Skull Camp, standing at the banks of Wooley Creek roughly 16 miles into the back country of the Marble Mountain Wilderness. There were three of us, clad head to toe in neoprene and dry suits with snorkels hanging off of masks that were pushed up on our foreheads. Putting our gloves on was a challenge in the cold mountain air. A balmy, almost tropical air temperature of 39 degrees Fahrenheit was combined with a water temperature of 41 degrees. The water was clear, cold, and moving quickly from the headwaters in the mountains above us. I looked at Carli, the CCC intern, who was standing next to me and

wondered if I looked as cold as she did. A sudden splash next to us made us both look over; Matt Cavin had just jumped in.

We were in the Marble Mountains to look for fall run chinook salmon. Wooley Creek is a tributary that feeds the Salmon River, which in turn dumps into the Klamath River near the town of Somes Bar. Its clear waters and long runs provide miles of fantastic spawning territory for chinook and steelhead salmon. It drops roughly 6,000 feet into the Salmon River. Nine of us woke up early on a Wednesday to meet at the trail head. Our packs were heavy with food for the three days, cold/wet gear, spare socks, and a

considerate amount of survey gear. Dry suits, buntings, snorkels, masks, stream boots, hoods, gloves and booties all had to be packed in with our winter camping gear. Our base camp was a cabin about 10 miles up Wooley Creek. We started out as a group, quickly learning that the Wooley Creek trail gains most of its altitude

Putting our gloves on was a challenge in the cold mountain air. A balmy, almost tropical air temperature of 39 degrees Fahrenheit was combined with a water temperature of 41 degrees.

straight from the parking lot. As we spread out it became more of a walk in small groups, then single hikers moving down the trail. firewood, signing the guest book, and pumping water were taken care of quickly.

Fowlers Cabin was the destination, and upon arriving I dropped my heavy pack, pumped water, and waited for the rest of the group. Camp chores such as chopping firewood, signing the guest book, and pumping water were taken care of quickly. A black bear was spotted across the river, and there was much rejoicing. Thoughts of abandoning the survey were tossed around, but we toughed it out....for the fish. Around the fire that night, reach assignments were handed out, sodas were guzzled and dates were eaten by the pound. Three of us were headed to the infamous reach four. This trip consisted of a six mile hike up the trail wearing dry suits, followed by a three mile survey down Wooley and a three mile walk back to Fowlers Cabin. The fire died down, the clock struck 8:30 and everyone headed to their respective sleeping bags. The stars were out, the night was cold, and my 20 degree summer bag (which I had brought to shave a few ounces off my pack) was just barely warm enough.



Photo taken by Alexa Andis

Well, back to the survey. Carli and I stared as Matt floated face down in the creek in front of us. We really were swimming in this creek. We looked at each other again and then climbed in. Surprise, surprise, the water was freezing. Noses quickly lost all feeling and my throat hurt from the cold air coming through the snorkel. As we swam through the water, the beauty of this frigid environment was impossible to ignore. Leafy debris and other particulates floated with us downstream. Mossy rocks covered the floor of the creek and juvenile trout swam past us, no doubt laughing at the surveyors in their cumbersome dive gear. We quickly learned that it was warmer in the water than out and the mossy rocks were increasingly difficult to walk on. At about noon that day, we stopped for lunch when all of a sudden something amazing started to happen, it got colder and started to snow. These were seriously large snowflakes that began to coat the banks of Wooley Creek. We still had about 1.5 miles of creek left to survey and walking on the banks became next to impossible as our stream boots were coated with ice. Swimming easily became the best option. Bathroom breaks were soon forgotten as it was too cold to strip out of the dry suit to use the nearby trees. Snorkeling down a creek while snow piled on the banks and landed on the surface of the water was one of the most amazing things I have ever done in the field. The cold was fierce but with the multitude of layers under the dry suit, it was tolerable.

We finished the survey after seeing several redds and a gigantic steelhead salmon, then hiked back to Fowlers Cabin in our dry suits. The reach 3 group had made it back to the cabin first and the smoke coming from the chimney was a truly refreshing sight. It seemed too cold to bother changing into the gear we had drove three miles, walked nine miles, and returned as victors to the cabin.

I had done other dives as part of my WSP experience before WooleyCreek, but nothing left as much of an impression on me as swimming down through the Marble Mountains in the snow. It was cold, exciting, and left me wanting to go back and survey again. We didn't see much in our reach, but we knew there was a large fish barrier on the reach below us known as the Cyr Chute. To see any redds in that section of Wooley is a victory for King salmon everywhere. We hiked out the next day but it was uneventful after the experience that we all had surveying our respective reaches. Wooley Creek is an amazing part of an amazing wilderness. I think I can speak for everyone when I say that it left a lasting impression on everyone that surveyed on that freezing, snowy, blustery November day.

Snorkeling down a creek while snow piled on the banks and landed on the surface of the water was one of the most amazing things I have ever done in the field.

Managing Conflict in the Klamath River Watershed

By Kristen Sellmer, placed at the Department of Fish & Wildlife Yreka

Coming together is only the beginning, keeping together is progress and working together is success. –Henry Ford

Natural resource management in the American West has long been defined by a fierce frontier mentality. However, changing views on resource use and allocation have shifted as citizens and resource managers struggle to find a balance between what is good for both economics and the environment. Water allocation in the west has become a poster child for conflicts such as these, as insatiable demands on water resources continue. In the Klamath Basin, resource managers must grapple with the ideologies citizens have attached to water resources and property rights as well as the counties economic roots in ranching and farming. They also much consider minimum instream flow recommendations to ensure the ecological health of the watershed. So how is a balance achieved?

As solutions to these demands are considered, the inherent wickedness of these issues persists, muddling a seemingly concise, technical process. The term wickedness is used to refer to a problem, not as evil or bad, but wicked because it contains dynamic complexities often driven by institutions, politics, morals and history- topics that don't always mesh well with technical data for problem solving. A need for measuring these social factors has motivated natural resource managers to implement methodologies that apply social science techniques to find resolution.

Recent actions taken by the California Department of Fish and Wildlife (CDFW) have demonstrated

this process. As water allocation decisions were left unresolved in the Scott and Shasta Watersheds, CDFW received funding to introduce a third party environmental consulting firm, Normandeau Associates, to assist in resolving the dispute. The Scott and Shasta watersheds are both considered high priority by the CDFW due to continued declines of endangered populations of salmon and steelhead. This is related to habitat loss and low stream flows. CDFW is required to recommend flows necessary to maintain habitat for fish and other aquatic life in these rivers and will eventually conduct a study to provide the data needed for this recommendation. Before the flow studies begin, CDFW is attempting to gather stakeholder input to help design the study and influence flow recommendations.

Normandeau has introduced the Legal-Institutional Analyses Model (LIAM) which has been successfully applied in the past to similar conflicts across the country. LIAM engages participants in the decision making process, collecting information on interest group perspectives through the use of questionnaires. The information is then analyzed using a computer model that illustrates if interest groups prefer or resist change and also if groups prefer to settle disputes through negotiation or litigation. Following this part of the process is a meeting to discuss the results with participants and further recommendations. LIAM was designed to help groups develop a "view" of the dispute. Analyzing disputes in this way allows groups to decide what type of decision making process would be best suited to help navigate the problem based on the position of the parties.

In the end, what seems most telling of the process is whether stakeholders prefer to find a solution through negotiation or litigation. It also determines how far apart each group views the other's aspirations as compared to their own.

Workshops to develop this initial phase of the LIAM process were completed in December 2012. January promises the development of a technical team recommended by stakeholders. The technical team will be made up of scientists, agricultural representatives and other partners to sift through new and existing data in order to develop a study plan. Once the technical team is formed, information from the initial phase will help guide the study planning process and stakeholders will be able to understand the opportunities and limitations that exist for them within an institutional framework.

LIAM is an example of one of the many adaptive management strategies developed to resolve water allocation conflicts in the West. There is no doubt that processes such as these are met with resistance and wrought with frustration. None-the-less, this type of conflict resolution is needed to meet the challenges of water needs in the West and to ensure the viability of our future. It is imperative that community members and local resource managers have the space to engage in policy decisions together. After all, no one is better suited to manage a particular watershed than all of the people living and working within it, despite all their



One Fish, Two Fish

By James Peterson, placed at the Mid Klamath Watershed Council

Being stationed at the Mid Klamath Watershed Council (MKWC) provides me a plethora of amazing and interesting work.

When I talk to friends, family and other WSP members about what I do for a job, I explain that my year is split up into quarters. The first quarter is predominantly salmonid spawner surveys, the second is education, the third being brushing and road surveys and last, but not least, is creek mouth enhancement. The first three rarely raise many inquiries but when I say creek mouth enhancement, most people hit me with a barrage of questions. Creek mouth enhancement basically means easing the passage of juvenile or adult fish into the colder tributaries or enhancing the thermal refugia that a cold tributary provides to the main stem. In June of 2012, WSP held its summer training in Orleans where members got to experience a day in the life of the members who are stationed in the area. The week was full of restoration tours, natural resource presentations and rafting trips down the Klamath. On one of these rafting trips led by Will Harling (MKWC Director) and Toz Soto (Karuk Tribe Fisheries Biologist), WSP members actually got to experience hands on work in the creek.

I give you Rogers Creek (top right photo). As you can tell from the picture, this creek has a steep mouth with a lot of fast moving water going down a small portion. For a fingerling salmon, ranging in size from 10mm to 45mm, this would be a harrowing obstacle to overcome and escape the warm waters of the Klamath River. Being that 99.9% of WSP members are trying to save the world, one fish at a time, we took action. By diverting some of the flow down the right side of the creek, armoring the channel and creating step pools, we greatly increased the chances of juvenile fish moving up into the creek.

This fall, the survey teams at the Forest Service documented two Chinook redds, as well as 10 juvenile coho salmon (*Oncorhynchus kisutch*) using the creek. This may seem like a small number to most people but when doing creek mouth work, any increase in fish is a sign that you are on the right track. In particular, coho juveniles over-winter (which means they stay in the creeks for much longer than Chinook or steelhead) and need access to these cold, slow moving creeks for their survival. It was a win-win situation for WSP members and the fish. Members got some fun in the sun and the fish benefited with a smooth ride into Rogers Creek.



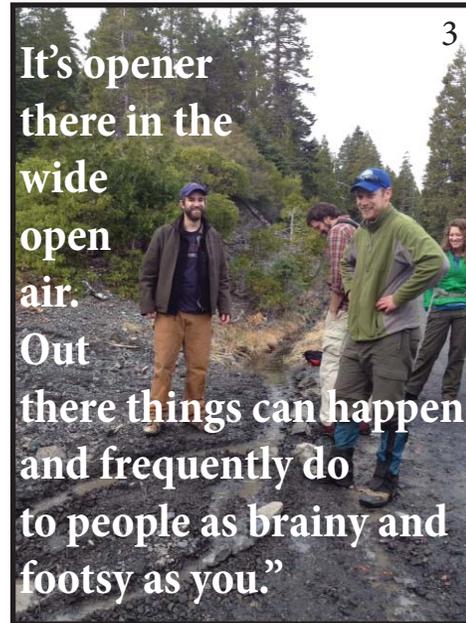
Oh, The Places You'll Go!

Written by Dr. Seuss

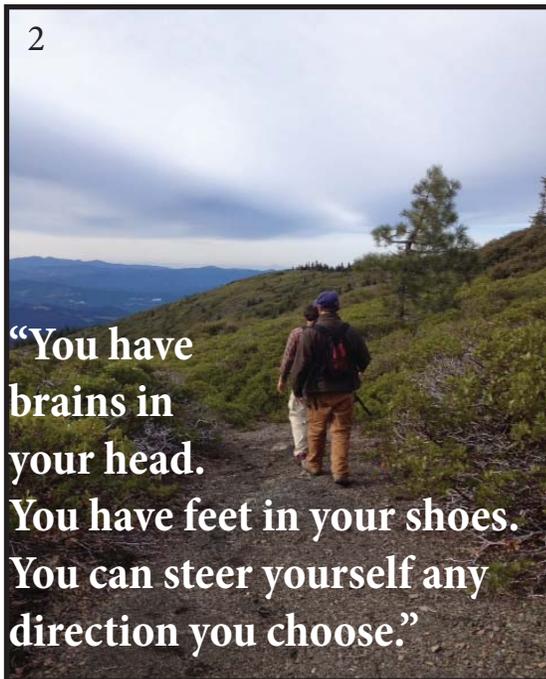
Arranged by Sara Tanis, placed at the Watershed Stewards Project Fortuna Office



Photo of District A members taken by Sara Tanis



Storm Patrol at its finest! Pictured: Dale Boerman, David Snyder, Patrick Fox, and Kathleen Torso. Photo taken by Sara Tanis



Patrick Fox and Dale Boerman Hiking Black Lassic. Photo taken by Sara Tanis



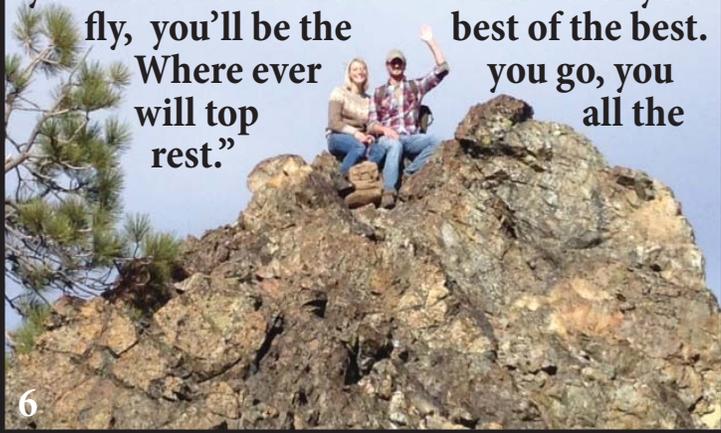
Photo of District A members taken by Sara Tanis



Photo of Adam Cockrill and David Snyder taken by Sara Tanis

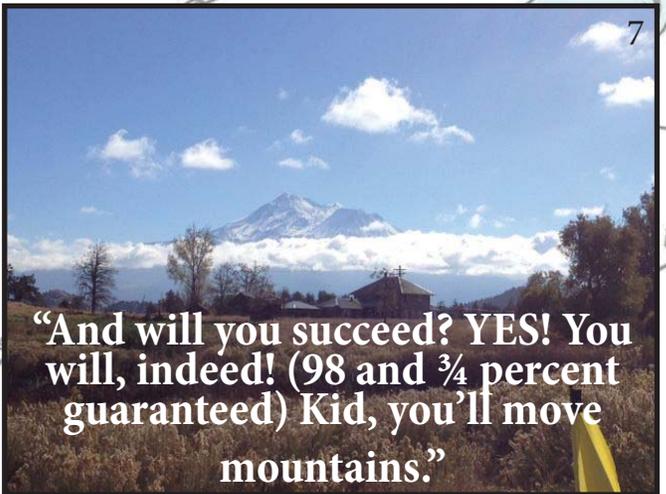
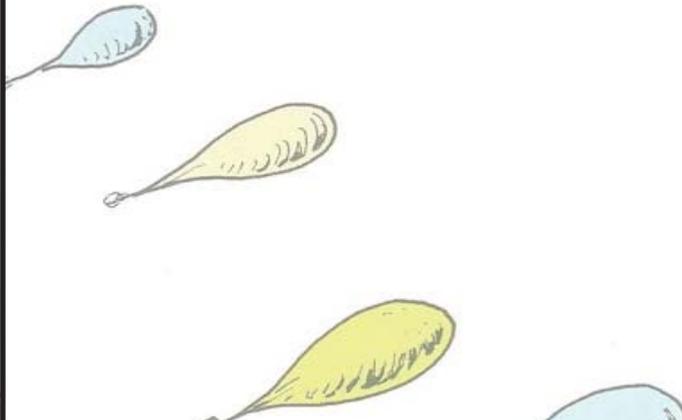


“You won’t lag behind, because you’ll have the speed. You’ll pass the whole gang and you’ll soon take the lead. Where ever you fly, you’ll be the best of the best. Where ever you go, you will top all the rest.”



6

Hike up to Black Lassic with Ericka Augustyn and Nicolas Massa. Photo taken by Sara Tanis



7

“And will you succeed? YES! You will, indeed! (98 and ¾ percent guaranteed) Kid, you’ll move mountains.”

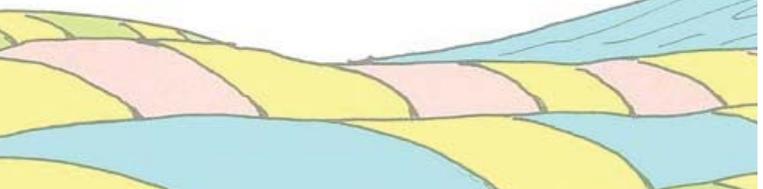
Photo of Mount Shasta taken by Sara Tanis



8

“With banner flip-flapping, once more you’ll ride high! Ready for anything under the sky. Ready because you’re that kind of guy.”

Pictured: Dale Boerman, David Snyder, and Kathryn Hennessey. Taken by Sara Tanis



“...you’re off to Great Places! Today is your day! Your mountain is waiting. So...get on your way!”

Dr. Seuss



9

Photo of and submitted by Sara Tanis

How do they know?

A story about redd identification on the Smith River and some resulting research.

By Adam Cockrill, placed at the Department of Fish & Wildlife Eureka

“So, you can see that this is a redd because of the larger polished boulders that make up the pot, and the smaller-sized gravel pile trailing on the downstream end.”

“Hmmm. To me it looks like that wood structure directly upstream is creating a big scour and resulting in a gravel pile.” “That’s definitely a redd.”

“There is no way that I could ever call that a redd.”



Discussions like the one above are commonplace for redd surveyors on the Smith River. In fact, it’s part of the protocol to deliberate about this unique data component. Identifying a redd may be something that some of us do everyday, or perhaps something some of us know little about. In this article, I will share with you my early experiences in redd I.D. and also inform you on some self-conducted research that gave me a more complete understanding about salmon nests and the egg-laying process.

Before the start of the spawner season on the Smith River, I was pretty sure I knew what to expect. I had asked several fisheries biologists for their favorite rivers in California and the Smith was invariably within the top three. My friends who had worked there in seasons prior described the Smith as “Beautiful” and being the “Best. Experience. Ever.” Setting the bar high was inevitable, as far as picturesque scenery was concerned. I would soon get to experience the magic of California’s second largest undammed river system.

Soon after my second week on the Smith, the honeymoon phase had come to a screeching halt. Sure, I had experienced the awesomeness of the river. I had seen the 95cm long spawning Chinook as they made their journey upstream. I had watched females violently battering their tails, and looked on as wayward salmon so poetically met their ends, their

operculum’s opening and closing for the last time. It was field season all right and our crew leader, Monty, had decided that it was time for us to start conducting surveys as primary observers. I was nervous with anticipation as we drove to the start of the reach. As my felt-bottomed boots sunk into the water that was 3°C, I contemplated the tasks at hand. If I was to be the first observer, that would mean I would be held responsible for overlooking a redd. This would allow the second observer the chance to “two” me. For those of you that may be unfamiliar with this protocol, let me explain.

In a Smith River Redd Survey, a typical survey crew is two people; one person takes the active measuring role and carries the stadia-rod while the other is in charge of data collection. All the data collected on the Smith is done electronically through a PDA system which prompts the crew with a series of questions during the survey. Before the crew begins the survey, they must also determine who will be the Primary Observer and who will be the Secondary Observer. The role of the Primary Observer is to walk ahead at his or her own pace and, essentially, be in charge of calling the redds, spotting carcasses, and watching for live fish. If for some reason the Primary Observer misses something, then the Secondary has the chance to call something that the primary has overlooked, or “two” them. Halfway through the survey reach, the observers switch roles.

Though it was intended to function as a checks and balances system for more accuracy on the part of the data collector, sometimes the observation protocol gets competitive. Sometimes there is disagreement between observers, and sometimes there is a heated discussion.

My very first redd survey as the Primary Observer was with our Crew Leader, Monty, who is a meticulous data collector with an eye for redd identification. As I moved slowly up stream, it felt like Monty was watching my every move and just waiting for the right moment to call out a redd that I had overlooked. The morning started out pretty slow. I called out a few redds unconfidently, which later we decided were scours. The day pressed on and we came upon several suspects in need of deliberation.

“Do you see a tail-spill or clean gravel?”

“That one could be an old redd, but I can’t conclusively call it.”

“That one has to be a scour, see that boulder upstream?”

“Nope, too chunky.”

“...Scour...”

“Scour!”

No matter how many times I saw a redd our deliberation kept coming to the same conclusion, I was clearly seeing something that wasn’t there. Phantom redds appearing where real redds should be. I just could not understand. What wasn’t Monty seeing? How did he know? How was I supposed to distinguish between fish gravel and scour gravel? I contemplated these questions as we pressed on and soon the stream had widened. It was almost lunch time, almost time to switch. I had nearly done it. I was in the clear and there was no way I could get “two-ed” now! Then, suddenly the riffle ended and flat tailout lay before me.

There was good spawning gravel as far as I could see. We hit the mother-load, the Redd Haven, Spawn City, if you will.

And then my heart sank. I knew the task that lay before me. There had to be redds here and getting “two-ed” was inevitable. I held my head up and narrowed my glare. Painstakingly I crept, careful not to disturb any sediment that could obstruct my vision. I called one large redd, and then another. Two, three, four... there were redds everywhere! We hit the mother-load all right. There were redds everywhere and I was finding them all. We had just finished collecting data on my last redd when I adjusted my stance to turn around. I was heading for the left bank, just about to take another step when I heard, “Hold it right there,” said Monty, “You are about to step on a redd.” Nooooooo! I thought to myself. How could this be? “Two-ed” on my first day as Primary Observer? My heart sank again. In my confidence, I had failed to see a tail-spill that was right in front of me.

As the days drew on and I gained more experience, my I.D. skills improved. However, I still couldn’t help but wonder how the other surveyors seemed to be so confident in calling out redds? I am certain now that like most skills out there, it takes time and experience to become confident. I soon realized that the Observer Protocol exists so that “newbies” can gain needed experience without risking the validity of the data. In time, I started to notice that other surveyors, when approaching a redd, seemed to avoid parts of the tail-spill at all costs while not worrying as much about the pot. I just didn’t understand how they were so sure about where a female would lay her eggs. So, like any good Biologist, I turned first to research. That was where I found the following interesting article: “Egg Pocket Depth and Particle Size Composition within Chinook Salmon Redds in the Trinity River, California” written by Danielle F. Evenson.

This article was a thesis presentation presented to the Humboldt State faculty in 2001 by a student, Danielle F. Evenson, conducting her Master’s in Watershed Management. It was one of many similar studies in Watershed Management programs that use liquid nitrogen to take

core samples of redds. They did this by gently pounding a specialized hollow metal stake into several redds and then using a funnel to add the nitrogen. With these core samples and other fisheries techniques, scientists were able to draw several conclusions about redds. Most of the research I found on redd identification mentioned that redds are often difficult to see.



(Left) Pouring liquid nitrogen in the Trinity River study area.

(Below) A frozen redd core-sample containing Chinook eggs.



Salmon are truly amazing creatures with unique lifecycle that is somehow linked with our own.

Even experienced anglers and scientists have difficulty seeing them during spawner season. I remembered getting trained in autumn, the redds seemed obvious because of all the periphyton covering the rocks. Periphyton, or the “complex mixture of algae, cyanobacteria, heterotrophic microbes, and detritus,” becomes submerged and adheres to the surfaces of rocks during summer low-flows. It eventually gets washed

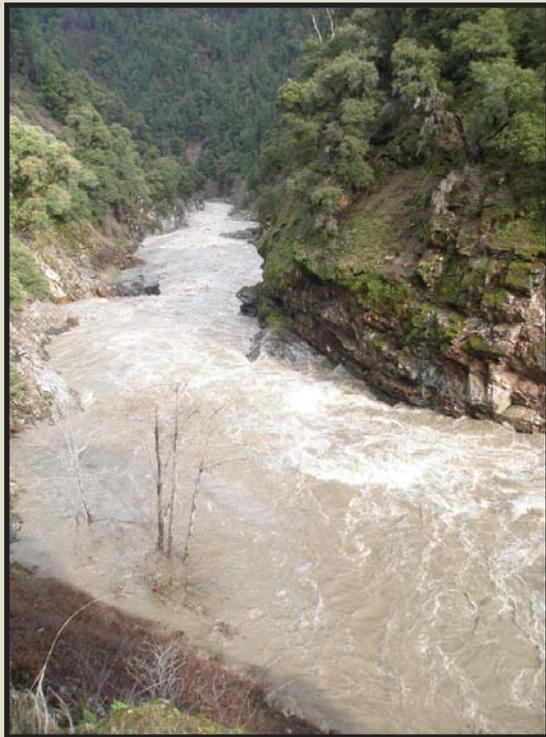
away or becomes covered during winter high-flows making it difficult to spot redds after the first big rain event. Chinook salmon, our most common redd-building species, are known to build redds in faster-moving water where visibility is often poor. Redd surveyors often have a difficult task and I couldn’t help but feeling somewhat relieved about getting “two-ed” back at Spawn City.

I also found written in Evenson’s thesis that fish tend to lay their eggs at the confluence of the tail-spill and pot and that the depth of the eggs can vary from 5.25cm at the shallowest to 51.5cm at the deepest. This makes the average egg depth, preferred by a Chinook female, to be about 22.5cm. Evenson also found that Chinook in the Trinity prefer a larger sized substrate when compared to other salmonids. All of the redds observed in her study were found in close association with woody debris. I found the association with woody debris to be intriguing because it seemed to make redd I.D. more difficult when distinguishing between a log scour and downstream redd.

After reading through Evenson’s thesis as well as others’ research papers, I found my appreciation for the redd building process had grown. Salmon are truly amazing creatures with a unique lifecycle that is somehow uncharacteristically linked with our own. I am continually humbled by my first redd observation experience and as I gain more experience my fascination for salmon fuels my desire to learn as much as I can from the experts and researchers who devote their lives to these sacred fish.

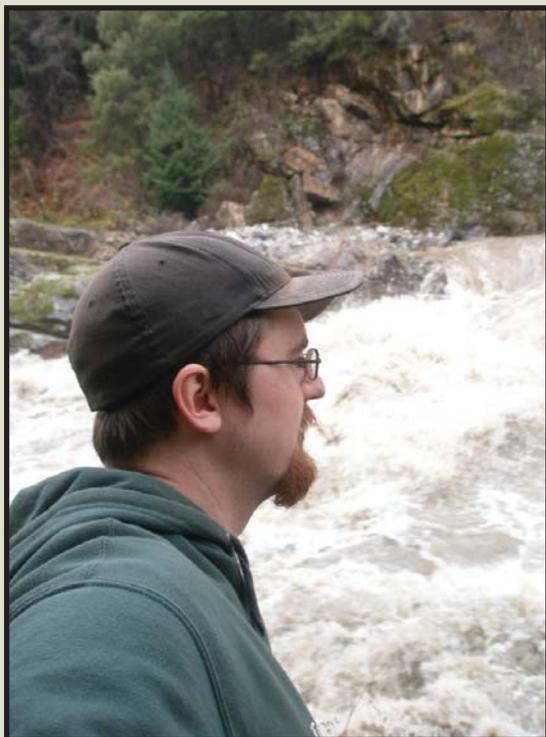
(Left) Aerial view of redds on the Santiam River in Oregon, easily visible due to periphyton.





My first snorkel survey on the Salmon River

By Alexa Andis, placed at the
US Forest Service Orleans



Wake up in my fleece bunting
Fish carcasses we will be hunting
We meet at the mouth of the Salmon River
My teeth chatter as I shiver

I strap on my dry suit
About to go on a salmon high speed pursuit!
Going out on reach 3 with my SP Big D
I think he may be as excited as me

Over the first riffle I zoom
Through the giant flume
Almost immediately I spot Redds
In the perfect gravel beds

All of the sudden I hear a loud shriek
My site partner was looking very bleak
His suit was left undone
He was no longer having fun

He took the time to ring it out
After many inappropriate shouts
We were back on the hunt again
Though his pride was slain

The first carcass came upon us
Matt Cavin processed it with great finesse
The otolith was removed
And Damien's attitude had improved

We continued on our way
I was thinking I could not have asked for a better day
Until I heard another shout
I turned around to find that Damien had begun to pout

The zipper had once again been neglected
And the water it was not deflected
We stopped to let him pour out his suit
Yes, it had even gotten into his boot

But maybe the second time is the charm
Because he did not sustain anymore harm
We are now done with our dives
We all escaped with our lives

But we will never forget
Damien's fret

The Awesome Apex Bar Jam

By Patrick Fox, placed at the Yurok Tribe Environmental Program



An Apex Bar Jam viewed from the upstream side (Photo Courtesy of Micah Gibson).

My site partner and I recently got the opportunity to attend the Salmonid Restoration Federation's (SRF) symposium on Coastal Off-Channel and Tidal Habitat Restoration. Part of this symposium consisted of a field trip to see some examples of off-channel habitat restoration where we got up close and personal with an awesome piece of restoration technology. The destination of the field trip was Hunter Creek, a tributary of the Klamath River located near Klamath, CA. Our tour guide Rocco Fiori, of Fiori GeoSciences, showed us some of his off-channel habitat restoration work which included the construction of an Apex Bar Jam.

The construction of these bad boys very much resembles the making of a layered cake. Rocco's recipe consists of logs keyed into the bed and stacked in front, placed semi-perpendicular to the flow, as well as logs running along the sides of the bar jam in the direction of flow. These logs are secured by vertical pilings, or piled into the bed diagonally themselves, and form a sort of framed box. Within this box, materials are layered in a specific order. First comes a layer of slash (thin willow branches and other young tree parts), then a layer of gravel, then another layer of slash and a final layer of gravel. Lastly, topped by a cherry (they aren't actually topped with cherries).

The order of the layers is important for several reasons. The first layer of slash helps to hold in the first gravel layer, which otherwise could be sapped out of gaps in the construct by the flow. The first layer of gravel serves as a porous medium for water to easily infiltrate. The second layer of slash then acts to further wick the water, raising the water level on the bar. The final layer of gravel works to contain the slash during high flows and potentially add stability for any future life

on the bar.

These "Island Seeds", as Rocco refers to them, perform several restorative purposes when plopped in the middle of a channel. The jam serves to split the flow of the channel, typically diverting a lesser flow towards one side and creating a slower-moving refuge for fish. A U-shaped scour pool also forms at the head of the jam, and along with other snagged woody debris, provides further habitat for fish. The overly-tall vertical pilings can also serve to snag debris during ridiculously high flows and maintain some velocity complexity if the bulk of the structure is buried in sediment.

Furthermore, in areas where sediment deposition has removed the water level from the reach of larger plant life, these bars can provide a foothold for trees to take root with higher water levels. This is especially the case when a small amount of moisture-retaining, fine-sediment get deposited on top. These potential trees can provide shading to the stream and increase future riparian health.

There is a lot to consider when designing these structures. The vulnerability of any downstream infrastructure to break away logs is one factor. Also, the construction process itself can be tough, as any sizeable jam will require heavy equipment. This equipment can be expensive and its operation could be harmful to any existing habitat. Despite these considerations, the apex bar jam is definitely a useful addition to the restoration tool box. If you get the chance, I definitely recommend checking one out.

The Death of a Salmon

By Connor McIntee, placed at the Department of Fish & Wildlife Arcata

Death comes in many forms. Death on the river has a very distinct smell. A smell that you sense long before death becomes visible. The carcass of a Pacific Salmon that is half buried in the sediment is leaching its decaying matter into the nostrils of all that come to pass by it. At first glance, one might dismiss the carcass as pungency not worthy of attention; one would shy away from such a stench.

However, there is more to the death of a salmon than meets the eye.

To understand the death of a living being, it is essential to understand its life. Fragility of life is a theme of nature and the Pacific Salmon do not escape that reality. Their death is a hardship, one of trial and weariness. But their death is also one of wisdom, tranquility, and peace.

The death of a salmon comes at the conjunction of life. For when a salmon dies, it inherently brings forth life. The journey of the salmon back to its spawning grounds is for the sole purpose of bringing forth new life for its species. However, the wholeness of the death of a salmon does not end there. After the passing of a salmon, it gives its nourishments back to the streams, the soils, the animals, and the earth from which it came. The true wonder in this majestic moment is that the salmon is at peace with its end goal and meets death with the same courage, vigor and intention that it greeted life.

To watch a salmon die is truly a blessing. I had the amazing opportunity to watch a salmon take its last breath, and struggle for the last time to complete its mission. As I watched the salmon drift downstream and become caught in a log jam, I could not help but see the weariness that it carried in its eyes. The fish, sensing it was about to die, calmly floated into the jam, accepting its end. The weariness began to fade as it took its last breath. The salmon, that truly fantastic creature, had come to the end of its journey, at peace with all it accomplished and a hope for the future of its kind.

So with the cycle complete, it is renewed once again. New life will begin, time will carry the carcass of the salmon into the sands of the sea and the new salmon will make its journey once again. When I see the death of a salmon, I see the trueness of its life, the completeness of its existence. In the end, I can but only hope that my life is led with such intention, such grace, and such majesty.



Weir Log 12/21/12: The End of the World

By Christopher Jaster, placed at the Department of Fish & Wildlife Arcata

1000 –My shift begins; darkness and cold and the sound of rushing water. Panel 3's vertical bars are loose and vibrating slightly. I open the office, open the shed, and hit the lights. Stepping out into the rain, I set up the station: scissors, scalpel, pocket knife, write-in-the-rain this and that. I check the scanner, the land scanner...they work. I check the trap: lower the gate and lift the floor. No fish, not yet.

1045 –Fish on, gate closed, floor lifted. I grab the dip net, scoop and lift, scoop and lift, scoop and lift. The current is strong and pulls the net to the bottom, downstream and to the end of the cage. I catch a coho, transfer the fish to the processing tub, take a look and work the scanner. No tag. I deduce that the coho is female (enlarged belly, little kypa). She's 80 cm. I scrape back some slime and take scales, a DNA sample from a caudal fin clip; I pick up the scalpel, mark a scale, breath in...breath out, insert and retract the blade. Momentarily she struggles; I hold her just above the caudal, gently rest my forearm against her body. With my other hand, I lift the syringe and put it in place. She calms. I insert the syringe and inject the PIT tag. I pick up the hole punch, the operculum, and punch. She's calm and I'm thankful. I send her down the chute. With no more fish in the cage, I lower the floor and open the gate; take the samples to the shed.

1115 –I check the cage: close the gate, lift the floor. No fish. Lower the floor, lift the gate.

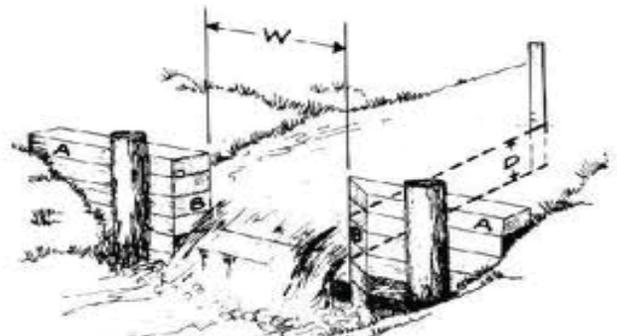
1120 –The rain falls and I periodically check the water level. If it rises above the 2 foot mark I'll have to drop the panels. Watch the rain, watch the flow.

1200 –I turn off the flood lights and sit beside the weir. The rain has died down and the wind has settled to a breeze. Closing my eyes I let my ears drift among the panels. I wonder if I could hear a fish in the cage or nosing along the weir in the dark. The water plays tricks on the ears just as it does with the eyes. Midday, two days ago, I was on the South Fork of the Elk River. Light and water played tricks on my eyes. 30 cm of visibility – is that a fish, I thought to myself again and again. A dark mass; a flicker of white in turbid water. Sometimes it is a fish. We ID species, sex and estimate length as well as take measurements of redds and GPS points.

0130 –Why am I here? We have tragically altered the landscape/watershed, forsaken its function/the fishery, the trees, the relation of water to the landscape. When did we stop observing the inherent good in things? When did we exchange wholeness for trinkets, immediacy, and frivolity?

0400 –Over fished. The efficiency of our technology and our drive to control the environment...we think we know best.

0515 –I've processed fish, cleaned the weir panels and the side channel, and sit in silence. It's time to go home.



A weir is a barrier built upon a river for the purpose of altering flow.

THERE AND BACK AGAIN...

A SALMON'S TALE

By Dale Boerman, placed at the US Forest Service Supervisor's Office

I grew up in Southern California. Most of the water I saw growing up was in the ocean or coming out of a faucet. Before joining the WSP program, the only salmon I had ever seen were at Costco stamped with 5.99/lb. stickers on them.

Whether you grew up in the Pacific Northwest or not, everyone knows the following about a salmon run. SPOILER ALERT: They die at the end. Like most people who do not rely on the salmon or have not witnessed a run, I took that for granted. I regarded it as an inferior trait conveniently aligned for human exploitation. However, having walked the streams and witnessed their runs myself, I have a newfound respect for salmon.

I gained that understanding the day I saw my first "zombie salmon". For those of you who do not know what a "zombie salmon" is, please let me explain. It is a salmon who has reached its spawning grounds, accomplished its task, and now idly awaits death (mind numbed like a zombie). If you splash at the "zombie salmon" it will not move. If you poke the "zombie salmon" it will not move. If you pick up the "zombie salmon" it will not move. It simply waits for the "grey rain-curtain of death". As I stood there observing the fringe between life and death, I grew puzzled. I could not figure out if the Salmon had suffered in death or had died satisfied by the thought of completing its life quest. This was something

I scrutinized very carefully. The longer I stood there, the more I thought it must be the latter.

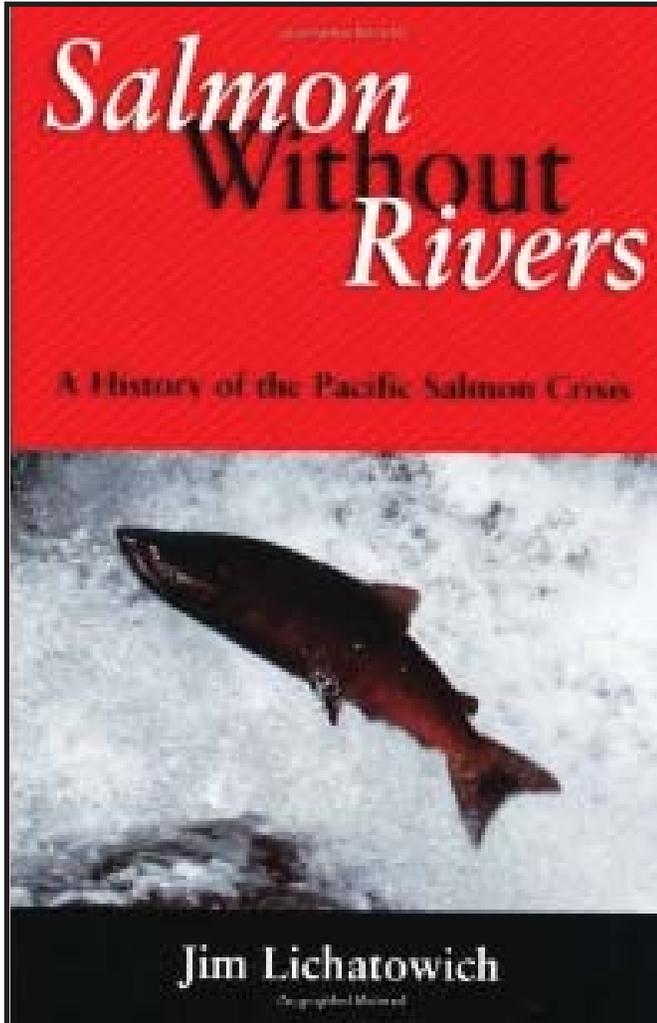
I thought of the ending of The Return of the King. Frodo, lying on the slopes of Mount Doom, rests easy for the first time since he set out on his journey. Like the salmon, he travelled far and overcame obstacles. While the salmon may not have had Orcs to run from, they've had us trying to catch them since we've first met. Much like Frodo, lying down on a rigged rock awaiting certain death, the salmon can rest easy. For just like Frodo, it has accomplished its task, giving life and hope to the future.

As I thought on the beauty of that sacrifice, I could not help but wonder. What if the rules changed and tomorrow our species' future relied on the same terms? Would we have any who would be willing and able to make the perilous journey only to have death waiting to greet them at the end? Because of these thoughts, I was able to walk away with a newfound respect for the salmon, now knowing the answer.



A Must Read for Salmon Enthusiasts!

By Rebecca Swanz, placed at the Department of Fish & Wildlife Yreka



“Salmon without Rivers” by Fisheries Biologist Jim Lichatowich traces the history and evolution of the Pacific salmon and its struggle to endure. The book offers detailed insight into the many productive rivers of the Pacific Northwest, the endless, uphill political battles to protect the salmon, the historical impacts of European settlement, and the loss of salmon due to a change-resistant scientific paradigm of past resource managers. A deeper appreciation of this mighty fish species is necessary to answer the call to the immediate action needed to restore salmon habitat and populations before we forever lose an invaluable member of our Pacific Northwest ecological community.

Excerpt: “For the past several decades, sustainability has eluded our grasp, and the salmon continue to slide toward extinction. All the power of science, all the organizational power of modern government, and all the wealth of the industrial economy have failed to find a way for humans and salmon to coexist in the watersheds of the Northwest...I am convinced that the first step in building a culture capable of coexisting with the salmon is the cultivation of attentiveness, encouraging people to listen to the world they live in...We simply cannot have salmon without healthy rivers. But it’s not just the salmon that need healthy rivers. We do too. We live in the same ecosystems as the salmon, so we cannot stand apart, manipulate, control and simplify these ecosystems without at some fundamental level diminishing ourselves.”

Klamath Estuary

By Kathleen Torso, placed at the Yurok Tribe Environmental Program



Figure 1.
Mouth of the
Estuary on
11/26/2012

The Klamath River Estuary is heavily monitored by the Yurok Tribe Environmental Program (YTEP) water quality and hydrology divisions. The fresh water of the Klamath River will mix with the salt water of the ocean creating brackish water, thus affecting the conductivity, pH, and dissolved oxygen along the Klamath River. Along with the effects on water quality, the estuary also plays a large role in the life cycle of the salmon that spawn in the Klamath River.

The mouth of the Klamath River Estuary is ever increasing due to the rain of the winter season. The mouth is regularly documented by YTEP staff and has significantly increased over the past month. These two images document the growth of the mouth.

Figure 1. was taken on November 11, 2012 and Figure 2. was taken on December 5, 2012.



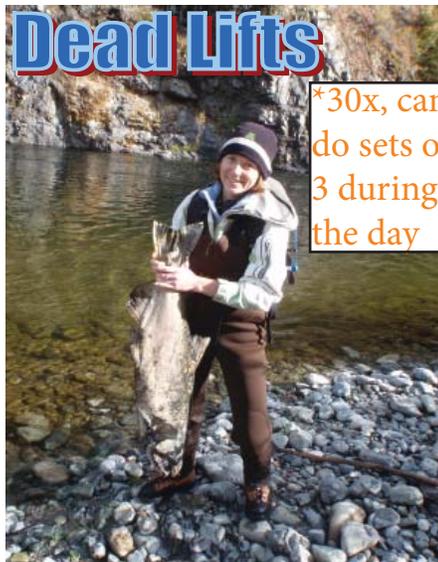
Figure 2.
Mouth of the
Estuary on
12/5/2013



Wader Work Out *By Katie Oldknow, placed at the Mid Klamath Watershed Council*
WSP provides its members with the highest quality benefits:

"Hard work, low pay, miserable conditions ... and more!"

Thankfully, part of the "and more" is an all inclusive gym membership! Here is how I get the most out of my membership...



Dead Lifts

*30x, can do sets of 3 during the day



ARM EXTENSIONS

*20x, I do these before the dead lifts.



Mountain Climbers

*20x, it's also a great way to find out what's on the other side!



*10x towards the end of the day to cool off.

Balance Beam

There is an endless amount of exercises fit for waders. Just throw on a pair and see what you can do!

*At least 50x, you can never do too many of these!

Squats



*2x, before and after your work out



Balance Beam

FISH FOOD

Ginger Roasted Salmon

Ingredients

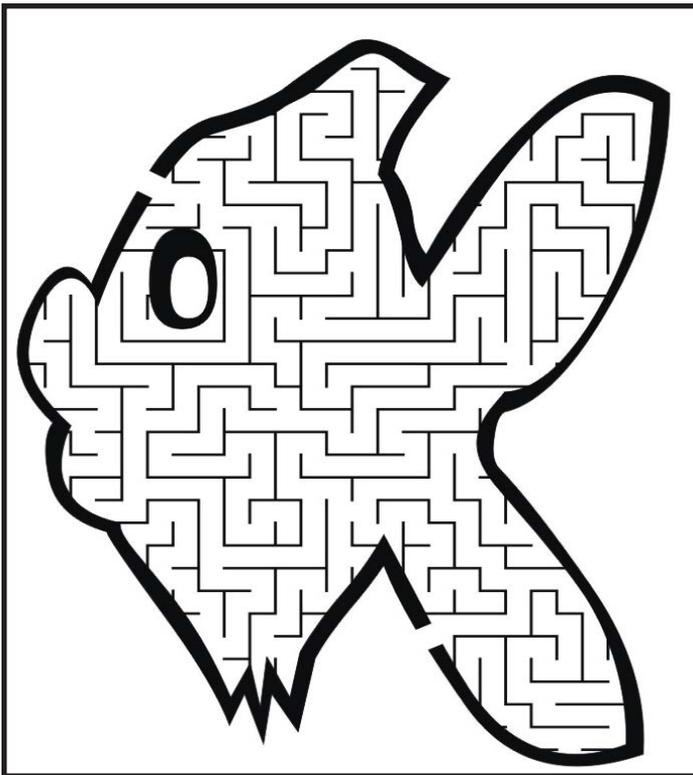
Nonstick cooking spray
4 boneless salmon fillets (6 oz each), skin on
1 tablespoon seasoned rice vinegar
2 teaspoons grated fresh ginger
2 teaspoons honey
2 teaspoons extra-virgin olive oil
Coarse salt and freshly ground black pepper

Directions

1. Preheat the oven to 425°. Line a baking sheet with a rack and spray with cooking spray.
2. Place salmon, skin side down, on rack. In a small bowl, whisk together vinegar, ginger, honey, and oil until well combined. Pour 1 teaspoon of the mixture over each salmon fillet; season with salt and pepper. Roast until just cooked through, 15 to 18 minutes.
3. Transfer salmon to serving plates and drizzle each with an additional teaspoon of the ginger mixture. Serve immediately.



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



Whose Fish?

This brainteaser, reportedly written by Einstein is difficult. Einstein said that 98% of the people in the world could not figure it out. Can you? There are five houses in a row in different colors. In each house lives a person with a different nationality. The five owners drink a different drink, eat a different food, and keep a different pet, one of which is a Walleye Pike. *The question is-- who owns the fish?*

Hints:

1. The Brit lives in the red house.
2. The Swede keeps dogs as pets.
3. The Dane drinks tea.
4. The green house is on the left of the white house.
5. The green house owner drinks coffee.
6. The person who eats peaches keeps birds.
7. The owner of the yellow house eats cherries.
8. The man living in the house right in the center drinks milk.
9. The man who eats celery lives next to the one who keeps cats.
10. The Norwegian lives in the first house.
11. The man who keeps horses lives next to the one who eats cherries.
12. The owner who eats plums drinks soda
13. The German eats pears.
14. The Norwegian lives next to the blue house.
15. The man who eats celery has a neighbor who drinks water.

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