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Tributary Tribune

Stories and art by members of the Watershed Stewards Project

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 special 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 Watershed Stewards Project. For twenty years WSP has been serving communities throughout California's coastal watersheds. This issue features stories and art by members from Region II, District D, which extends from Santa Cruz to Agoura Hills, CA.

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Credits

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Front Cover Image: CDFW Santa Barbara ISP site – Refugio Creek Mouth, Refugio State Beach, Goleta, CA

Back Cover Image: RCD Santa Cruz County and NMFS ISP Site – Willow Canyon Ecological Reserve, Aptos, CA

Snorkeling for O. mykiss Spots

By Crystal Garcia

placed at RCD Santa Monica Mountains

Feels tight
It's hard to move
Yoga positions I never knew
Dipping and squinting
Time flies by

Pools and riffles
Spots to search
Spots to find
One Chub, two chub
Still no dots

Twisting and turning
Harder to move
Yoga positions not so new
Dipping and squinting
Time stands still

Bubbles and chuckles
Not so hard
A shimmer to see
A glimmer I see
Dots and spots

Dreamcatcher:
Made from native riparian plants and recycled habitat typing string

By Kayti Christianson

placed at DFW Santa Barbara

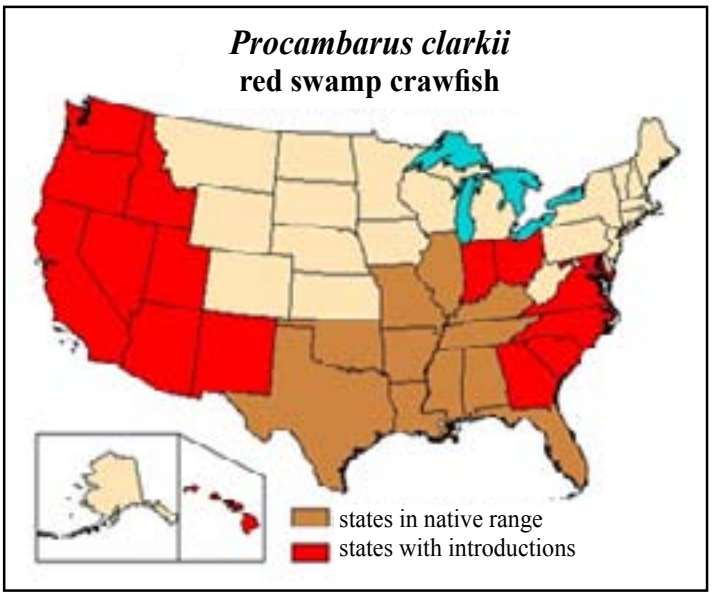
P. clarkii - A March to Conquer the World: A Literature Review

By Lizzy Montgomery
placed at RCD Santa Monica Mountains

Procambarus clarkii have invaded Topanga Creek. In fact, this mudbug has found its way into non-native streams on a global scale. They are invasive crawfish on the march, and researchers are worried. Could non-native crawfish be the culprit in observed declines of amphibians like newts, frogs, and toads? Their generalist grazing patterns do include the consumption of amphibian eggs and larva. Other critters are potentially at risk; all three species of crawfish native to Northern California are facing significant decline or extinction. The trade of P clarkii as fishing bait, food, or pets, and their inevitable escape, is thought to be one way these creatures are introduced to new places. Procambarus clarkii, the American red swamp crawfish, has become a widespread threat in Southern California.

Nestled in a Santa Monica Mountain canyon, Topanga Creek is a prime example of one stream affected by these far-flung crustaceans. I have observed on recent snorkel surveys that red swamp crawfish, native to southeast US, are quite a common sight, while our native CA newt, CA red-legged frog, CA and Pacific tree frogs are rarely sighted. Could P. clarkii, who came to Southern CA as early as 1924, be waging war against our native amphibians? Can the global decline of the amphibian class be linked to non-native species invasions, or are other phenomena to blame? And finally, if crawfish are the culprit, can they be stopped? I've turned to the literature to find out more.

The first report comes from Seth Gamradt and Lee Kats[1], who observed the relationship between mosquitofish (an intentionally introduced non-native… can you guess for what purpose?), invasive red swamp crawfish, and the native California Newt. According to amphibian surveys conducted from 1981-1986, a total of 10 Santa Monica Mountain streams contained California Newts. When the surveys were repeated in 1994, 3 of those 10 streams were suddenly newt-less. Alarmed, the researchers brought everyone back to the lab: mosquitofish, crawfish, and newts. They found that while both predators were snacking on newt larva, their consumption varied. In a 24 hour period of enclosure, 13% of newt larva survived play time with mosquitofish while 0% survived the crawfish. P. clarkii, not mosquitofish, also consumed newt egg masses, rendering them doubly taxing opponents in a laboratory setting.



Gamradt and Kats' theory that P. clarkii was a detriment to newt populations in the Santa Monica Mountains was upheld the following year: after heavy winter rains washed the crawfish out, newt egg masses, larva, and adults were present the following spring. The fact that adults returned to a stream they had previously left, lead the researchers to include another theory in their report that newts will select for streams in which crawfish are absent. While there are few to no mosquitofish in the main stem of Topanga Creek, the presence of P. clarkii seems to be a likely factor contributing to missing newts due to both avoidance and predation on eggs and larvae.

To gain an international perspective, our next study brings us to Northern Italy. Here, the spread of P. clarkii has been observed since 2006. Ficetola et al.[2] set out to find what sort of effects red swamp crawfish were having on the breeding habits and aquatic larval abundance of nine local amphibians including newts, toads, and frogs. One-hundred and twenty-five wetlands were surveyed for P. clarkii and for amphibian breeding sites. Amphibian larvae and crawfish were also collected from 34 wetland ponds. Ficetola's crew found that the presence of crawfish reduce the number of newt, salamander, toad, and tree frog breeding sites, while 3 other frog species remained unaffected. In contrast, there was a negative association between larval abundance and crawfish presence across all seven species sampled. One frog

species, who did not hesitate to breed in crawfish waters, had a near zero success rate in terms of larval abundance. While newts and other amphibians avoided crawfish infested wetlands, some frogs continued to breed in these areas spending precious, yet possibly futile time and energy. The authors conclude that measures should be taken to prevent the spread of crawfish and emphasize that removal efforts should be directed towards wetlands most suitable for amphibians.

Back in the Santa Monica Mountains in 2013, UCLA's Pease and Wayne[3] set out to examine the morphological and behavioral responses of Pacific tree frog tadpoles to red swamp crawfish predation. They explain how native species can adapt to the intrusion of non-native predators through morphological or behavioral adaptations. From 2007-2009 they collected tadpoles from six Santa Monica Mountain streams, three of which harbored crawfish. Between sites they found a significant difference in the body shape of tadpoles; those from crawfish-bearing streams had a deeper head and body and a shallower upper tail fin and tail muscle than those from crawfish-barren streams. They also found that tadpoles exposed to 'crayfish chemical cues' significantly altered their behavior, by moving less or resting more. This response was found among both groups of tadpoles, no matter the origin. Despite these noted morphological or behavioral changes, the survival rates of experimental tadpoles were equal and did not depend on previous crawfish experience. Citing this and the fact that that other local species, like the CA newt, are fewer in number than the Pacific tree frog, it is recommend that the effort to remove and control the spread of P. clarkii is continued.

Finally, a 2013 article from Gherdari et al.[4] speaks to address how the increase in global average temperature that we are currently experiencing could affect P. clarkii invasions in the future. Understanding that changes in climate can lead to shifts in territory and interactions between antagonistic species, this group of European researchers conducted a laboratory experiment to compare how three species of invasive crawfish would respond to increased water temperatures. The behavior of O. limosus, P. leniusculus, and P. clarkii, all North American natives, was observed in 20oC (current maximum in study region) or 27oC (IPCC expected temp. in 80 years under most pessimistic model) water temperatures. They found that with increased temperatures, O. limosus spent more time being inactive and P. leniusculus became more subordinate during fights. However, P. clarkii did not have a behavioral response to the increased temperature and in fighting would outcompete both O. limosus and P. leniusculus. They fear that if Procambarus clarkii is more able than other competitors to thrive under conditions of increased temperature, they continue to invade new areas and impoverish biodiversity.

Currently, amphibian populations are on the decline. Nearly one-third of Earth's 6,800+ amphibians are becoming or have become extinct. According to a United States Geological Survey report, amphibian populations are declining 3.7 percent on average each year in the United States.[5] While many reasons are speculated upon, few provide comprehensive explanations. Deforestation, pollution, climate change, disease, and invasive species are all weighed on local and global scales. In Topanga Canyon, could the introduction of P. clarkii be contributing to the observed losses of native newts, frogs, and toads? Or are the fates of our local amphibians linked to other global phenomena? Perhaps, more than one factor is at play.

As the march of red swamp crawfish continues on, so do the efforts of scientists and researchers to address these questions. As WSP members with the Resource Conservation District of the Santa Monica Mountains, my site partner Crystal Garcia and I are currently part of a research project that aims to determine how the removal of Procambarus clarkii from certain reaches of Topanga Creek might affect different environmental factors, and if removal efforts can be sustained successfully. To be continued…

Works Cited

[1] Gamradt, Seth and Kats, Lee 2002. Effect of Introduced Crayfish and Mosquitofish on California Newts. Conservation Biology. Vol 10; No. 4: pp. 1155-1162.

[2] Ficetola, Gentile et al. 2011. Early assessment of the impact of alien species: differential consequences of an invasive crayfish on adult and larval amphibians. Diversity and Distributions. Vol. 17; No. 6: pp. 1141–1151.

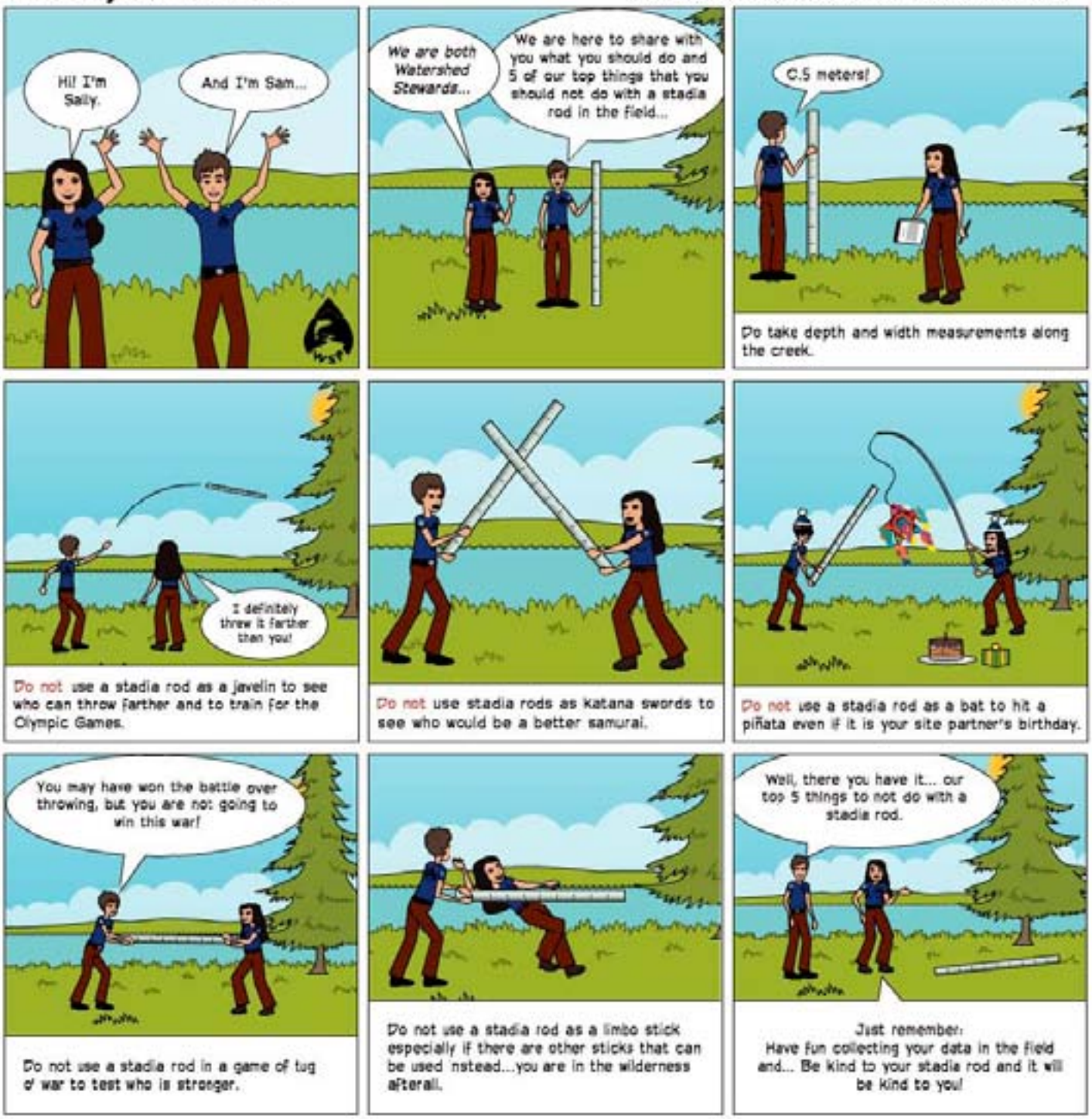
[3] Pease, Katherine and Wayne, R. 2013. Divergent responses of exposed and naive Pacific tree frog tadpoles to invasive predatory crayfish. Oecologia. Vol. 2; No. 174(1): pp. 241-252.

[4] Gherardi, Francesca et al. 2013. Climate warming and the agonistic behaviour of invasive crayfishes in Europe. Freshwater Biology. Vol. 58; No. 9: pp. 1958-1967.

[5] Adams et al., Trends in amphibian occupancy in the United States. Plos ONE 8:e64347 CrossRef, Medline.

A Friendly PSA from WSP

By David Gottesman, placed at DFW Santa Barbara



So far, in my placement at the Resource Conservation District of Santa Cruz County, the number one question I have gotten is, "what is a resource conservation district?" Despite having been around for decades, RCDs are a relatively unknown branch of local governments; even among people who are ecologically aware. Much like WSP is "A project of the California Conservation Corps,administered by CaliforniaVolunteers, and sponsored by the Corporation for National and CommunityService."; RCD's have a somewhat confusing place within the government. Let me explain:

What is a Resource Conservation District?

By John Drips

placed at RCD Santa Cruz County

A Resource Conservation District (RCD) is an organization that is federally-supported, locally run, and established under state law that seeks to conserve environmental resources (mostly soil and water) within its boundaries. Beyond that, what an RCD does is up to the specific RCD. Furthermore, it is up to the staff they maintain, the funding they are able to gather, and the needs of the local government and people. The ambiguity of RCDs is intentional because the needs of communities vary so greatly that a single mission federal agency could not provide for them. Like a non-profit, an RCD is run by a volunteer board of directors that reside within the RCD's boundaries. The federal support an RCD receives comes mostly from the Natural Resource Conservation Service (formerly the Soil Conservation Service), which traditionally, worked with farmers to implement land management practices that are in the national interest. The NRCS has technically trained staff that help assess, evaluate, recommend, and design land management practices and projects to conserve natural resources. Because the NRCS is working on private lands to support landowners in conserving resources, they are in a supportive role and also provide a conduit for federal subsidies to farmers.

Resource Conservation Districts are intended to be part of the community and thus do not regulate landowner actions but only support them. Much in the same way a school would not report an undocumented immigrant to the Immigration and Naturalization Service, RCDs do not report violations of the law to the appropriate authorities and they deal confidentially with landowners in support of the landowners' goals and conservation. RCDs are a special district, much like a school district or a library district; they autonomously provide a specialized function within a specific boundary. The RCD of Santa Cruz County happens to have district boundaries that fall along the county line. This is typical of RCDs, as county lines (and county governments) are an established means of support and authority within communities that are predominantly rural (as rural areas have the most natural resources to conserve). However, there are plenty of examples in California where the boundaries are similar, but not equal, as RCD boundaries sometimes split counties. There are many parts of California that are not incorporated within any RCD.

After that long winded explanation, my guess is you probably have another question: "But really, what does an RCD do?" For that, I can only answer what the Santa Cruz RCD does:

> "[RCDs] provide funding, planning, permitting, coordinating, and consulting services to landowners in implementing conservation projects."

The Santa Cruz RCD is an umbrella organization for local ecological entrepreneurs. They provide funding, planning, permitting, coordinating, and consulting services to landowners in implementing conservation projects. This could be on projects that the landowner is compelled to implement by a regulatory agency or that the landowner is interested in doing for the ecological benefits alone. The RCD also helps coordinate and prioritize conservation projects on a county-wide basis ensuring that local conservation dollars are spent on the most urgent and important projects with the highest likelihood for success. Because the RCD is a resource for landowners, it also provides environmental education on land management practices and environmental education for school groups as funding is available.

And what does any of this have to do with salmon? As we all know, salmon are an ecological priority in California. As long as they continue to be, RCDs will continue to facilitate salmonid conservation projects like dam removals, erosion control, and LWD installations. As this generation of WSPers graduates to positions beyond WSP, remember RCDs, they might come in handy.

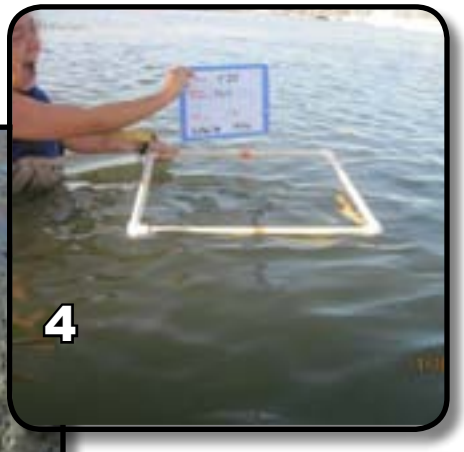
A Snapshot of San Luis Obispo

By Larissa Clarke
placed at San Luis Obispo Steelhead Initiative

Greetings y'all from the San Luis Obispo Steelhead Initiative! Here are some fun yet informative photos to let you know what we have been up to down here on the Central Coast.

John and I felt the best way to truly get off to a positive start as WSPers was to embody the roles of the salmonid life cycle. We were introduced to the California Conservation Corps-Los Padres members on Halloween, along with our lovely Team Leader and salmonid enthusiast, Brittany, sporting fabulous homemade, sequin-finned salmonid costumes (*Photo 1)*. We may get funny looks when we are on center these days, but I think everyone learned a bit during our introduction about the Watershed Stewards Project and no one can deny how well John rocks a costume fit for an elementary school child.

Recently, at the CCC center John and I have been gathering seeds and getting our hands dirty in the nursery, propagating native plants. When not at the CCC, we may be found at the Morro Bay National Estuary Program or at Central Coast Salmon Enhancement. At the Estuary Program we have been conducting cross sectional surveys of the creeks in the area as well as completing surveys of the elusive eel grass in the estuary, which has been in decline without a clear cause (*Photos 2 & 3*). Alongside restorationist Jen Nix, John and I conducted eel grass surveys to better understand the current abundance of eel grass in the estuary. On our last day of this work, John figured it only made sense to let the shorter of the two site partners wade into the deepest areas of our transect tape (*Photo 4*). The water was refreshingly chilly to say the least!



Brittany, John, and I have been enjoying picnic table lunch breaks, giving love to our new greenhouse seedlings, and are looking forward (especially John) to more opportunities to get back in our salmonid costumes in 2014!

Salmonid Poetry

Somewhere
Tucked beneath the
Emerald
Eaves of fallen willow
Leaves, somewhere
Hidden beneath the
Earth
A fish listens in wait,
Dreaming to create

Tinsel finned
Reaper
Of chance, an
Undeniable emulation,
The way of earthly creation

By John Hardy
placed at San Luis Obispo Steelhead Initiative

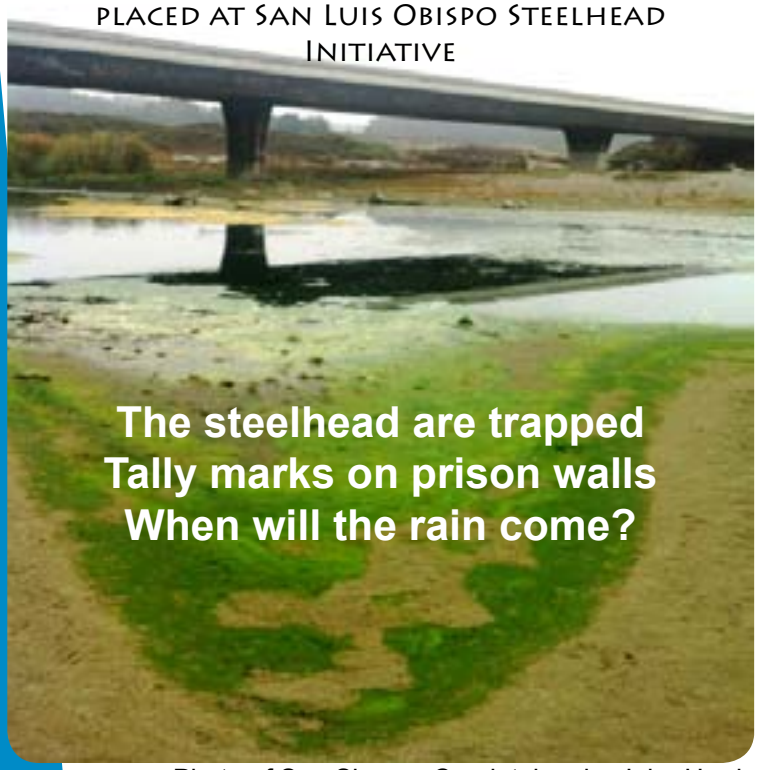


Photo of San Simeon Creek taken by John Hardy

By Lizzy Montgomery
placed at RCD Santa Monica Mountains

Slingin' Hotdogs for Salmonid Science

By Chris Loomis

placed at RCD Santa Cruz County

It's a crisp dawn on the Central California coast as Anne-Marie Osterback and her assistants arrive at the mouth of Soquel Creek. The team is ready for another session of research on the fish and birds that live and feed in this sandy exchange of sweet and salt water. Working efficiently across the uneven sand and against sharp winds, they set up their equipment: a video camera, lawn chairs, a sling shot---and a neatly labeled case of diced hotdogs.

These nontraditional experiments "could have huge implications for the already threatened fish" that live in our local streams, says Osterback, a graduate student in freshwater ecology at the University of California, Santa Cruz. "That feels a little weird to say when we are feeding all these birds hot dogs."

> "[Gulls] are opportunistic feeders. There they are, bathing in the gauntlet the juvenile fish have to swim through."

The pork product is helping Osterback track the fates of the iconic salmon and steelhead on their journey to adulthood. She and other researchers believe gulls could be gorging on juvenile salmon and steelhead, stifling their future. Coupled with an explosion in gull populations, hopes for rehabilitating the already stressed fishes are stretching thin.

Osterback and her team attract a hoard of hungry gulls with breaded bait. She loads a hot dog concealing a Passive Integrated Transponder (PIT) tag into the sling shot, calls out its respective number, and fires away with a high arcing trajectory. The loaded roll of processed meat lands in the feeding lane of an adult gull and is quickly gobbled down.

The team hopes this gull will later deposit the PIT tag at its roosting grounds, giving Osterback valuable data about the gulls' local feeding habits. Based on how many PIT tags they recover from these experiments, the researchers hope to estimate the proportion of food taken from the beach and deposited at the nest site. For the moment, it's unclear how many fish disappear into gull gullets at each coastal stream and where those respective birds roost. Finding the hot dog tags should connect those dots, giving conservationists a clearer picture of how to manage fish and fowl.

Osterback became interested in this topic after Patricia Morris, assistant manager of the Año Nuevo Island Reserve, found an unfamiliar object on the island north of Santa Cruz in June 2006. While crawling through the remnants of gull nesting habitat to get a better view of some elephant seals, Morris found what she later learned was a PIT tag. A colleague discovered that the tag was previously implanted in a salmon from Scott Creek. How this tag made its way to the island was a mystery at the time.

A PIT tag is a tiny device that stores unique information, typically an ID number. Encased in glass and not much larger than a grain of rice, the tiny circuit of a PIT tag embeds a code that a special scanner can detect. Today, veterinarians implant most domestic pets with these tags so they can be reunited with their owners if they are lost. Biologists surgically implant PIT tags in their research specimens, either as adults or as juveniles. The tags usually remain throughout the life of the animal.

Osterback and other UCSC researchers decided to search Año Nuevo Island for more tags. The team used long wands with scanners fixed to the end to sweep the island methodically, like beach combers with metal detectors. Since winter of 2006, they found 213 tags originating from local salmon and steelhead tagged between 2003 and 2008.

Most of the tags were found among gull droppings in old nesting territory, pointing the finger at local gulls. "Gull populations have been increasing for at least the last five years," Osterback says. "And they are opportunistic feeders. There they are, bathing in the gauntlet the juvenile fish have to swim through." Humans are partly at fault; trash and food waste have supplemented coastal gull diets.

If a gull sees something it thinks might be food, it tries it out. "We've seen them tasting rocks before," Osterback says. But the gulls are savvy; Osterback's collaborator, Danielle Frechette, watched the birds devour 20 juvenile steelhead at Scott Creek during a hatchery release.

Now Osterback finds herself sitting on the beach every other morning feeding PIT tags into the gull population, aiming to get good statistics that can shed light on salmon and steelhead predation. "It's been pretty great

to do my research on the beach. I would never have expected this," says Osterback. She recalled a morning spent in Capitola at the mouth of Soquel Creek when a local restaurant blasted Michael Jackson tunes from the dining deck while Osterback and her assistants worked. "Hot dogs were kind of a joke that turned into something real," says Osterback with a smile. In a twist of irony the project has turned into a subtle satire on how humans are inflating gull populations. However, to compare differences between digesting a fish and a hot dog, the team is deploying some tagged baitfish along with the dogs. This will act as a control to support their hot dog data and strengthen their projections.

"We are trying to fill in the gaps between the patterns we see," says Osterback, describing the design of their experiment. For instance, most PIT tags found on the island come from fish released in north coast streams like Scott Creek and Gazos Creek, with only a few coming from more southern streams like Soquel Creek and the San Lorenzo River. Logically, gulls that nest on the island probably feed at nearby sites like Scott Creek, but Scott Creek also runs a hatchery program that releases more tagged fish per year than other streams. The specific hot dog tags she recovers from Año Nuevo Island should reveal where the gulls' dine and nest.

Meanwhile, Danielle Frechette tracks where gulls travel and how they move. She attaches radio transponders to captured gulls and then releases them. The transponders produce a much more powerful signal than PIT tags, allowing Frechette to track individual gulls along the central coast. This should reveal which nesting and feeding grounds they prefer. Frechette and Osterback will combine and analyze their data to produce a final report.

As a side project to supplement the study, Osterback will dig through the natural archives of the California Academy of Sciences. By analyzing the chemical composition of gull feather samples throughout history, she hopes to gauge whether the diet profiles of the birds have changed. Diets sourced from the ocean will have captured carbon through algae which use C3 photosynthesis. Food supplemented by humans will have a large contribution from corn, a C4 photosynthesizer, and will be chemically distinct from C3 carbon compounds. This should give researchers a better idea of whether rising gull populations have factored into salmon declines.

The iconic salmon populations have deteriorated from direct and indirect human impacts. For the first time ever, the California Department of Fish and Wildlife suspended the annual salmon season for sport and commercial fishing from 2008 to 2009 and severely limited the season in 2010. Although subsequent seasons have shown dramatic increases in the health of local salmonid populations, some species are still on the verge of extinction in Central California. The problems with dammed rivers, contaminated water, and overfishing are recognized and continually disputed. Now, it seems gull overpopulation could be another force holding back the once plentiful steelhead and salmon.

Juvenile salmon are born fighting for their lives. "This is the critical transition for the species," explains Osterback, describing the harrowing journey from smolt to reproductive adult. The next generation of salmon or steelhead are doomed if the juveniles cannot make it past the beach-front gull buffet.

Osterback and her team face some crucial next steps. Most importantly, they must search for tags from the hot dogs on Año Nuevo Island. "We literally want to walk all over the island," says Osterback. However, thousands of protected marine animals also occupy the island, limiting the team's access. To date, their few outings to the island have yielded only six PIT tags from more than 2000 gulls fed. "I won't have any conclusions from that experiment until I can really scan the island next fall," says Osterback.

If gull predation is significant to salmon and steelhead populations, the team has a possible solution to help the fish. A falconer, a person that trains and flies falcons and hawks, would be deployed at key beaches during juvenile fish migration. Their birds of prey would ward off the pesky gulls with little or no impact to the rest of the community.

The journey from grilling meat to research equipment is a success story for the hot dog, but the lowly meat medley would be nothing without the insatiable hunger of coastal gulls. If conservationists listen to the tale Osterback and her thousands of hot dogs have to tell, they might help cull the gulls' craving for salmon and rehabilitate the dwindling fish populations. "That's the link that's hard to find," says Osterback "We can't set management laws, but the hope is that our information will be used."

Passive Integrated Transponder Antennas

By Emerson Kanawi
placed at NMFS Santa Cruz

Fish are finicky creatures. Slimy, wet, and, all around hard to handle, but the use of Passive Integrated Transponder (PIT) tags in fish allow data on movement to be collected without harassing the fish. PIT tags are small devices comprised of an integrated circuit chip, capacitor, and antenna coil encased in glass (Roussel et al. 2000) that can be implanted within the body cavity of a fish, giving the individual a unique barcode that can be stored and updated next time the fish is scanned (Fig. 1). This technology not only tracks a fish's movement, but also calculates their growth rate upon recapture by taking their weight and length. Once recaptured, scanning a fish can take place in a couple of different ways. A fish can be scanned using a mobile or handheld reader, where a person out in the field, hiking through the creek is scanning; or when a fish is captured, a handheld reader can be used to swipe for a PIT tag.

Figure 1. Installation of PIT tag into juvenile Salmonid using a hypodermic needle.

In addition to these tools, PIT tag antennas can be set up within the stream channel to record PIT tag detections eliminating the need for a human presence. To detect a PIT tag, a small-range electromagnetic field is induced by a reader and when a PIT tag enters that field, a unique alphanumeric code will be sent wirelessly from the tag to the reader and stored. Additional information can include a timestamp, water temperature, and other physical water parameters depending on the set up of the system.

Figure 2. Photograph of two instream antennas set up to assess directionality of PIT tagged fishing.

There are a few basic components of this system that can be expanded depending on a researcher's needs. The essential items include the antenna made of a loop of wire (Fig. 2); a tuning-box that will determine which

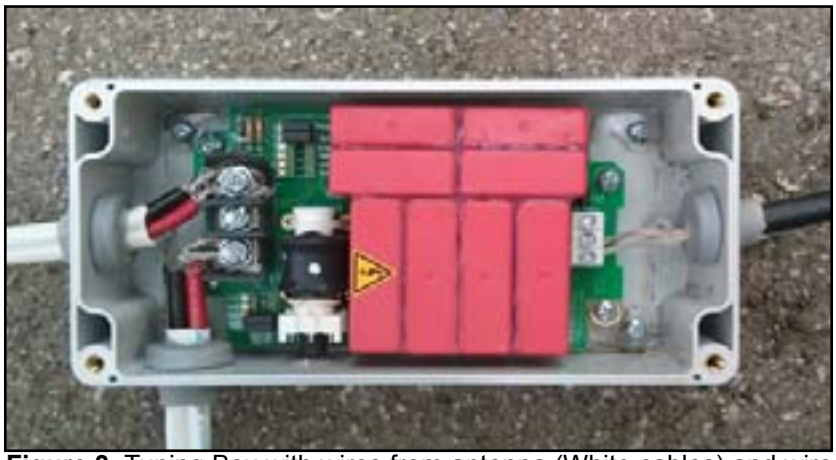


Figure 3. Tuning Box with wires from antenna (White cables) and wire to reader (Black cable).

Figure 4. Steel box containing Reader Box (Left) and Power Supply (Right).

PIT tag frequency resonates most clearly within the electromagnetic field (Fig. 3); a reader system that is able to decipher the PIT tag's data and store it locally (Fig. 4); and lastly, a power supply for the system. Within each of the categories there are many different options to be used. For example, each component can be made individually or bought as an off-the-shelf option. A steady power supply can be obtained from properly maintained batteries, solar power, or tapping into an existing 120V power line. Additional antennas, water quality equipment, and coordinated field work added to this basic PIT tag system can be a powerful tool to determine the direction and timing of fish movement as well as a response to local environmental disturbances.

Works Cited:

Roussel, J. M. et al. Field test of a new method for tracking small fishes in shallow rivers using passive integrated transponder technology. Canadian Journal of Fisheries and Aquatic Sciences 57, 1326-1339 (2000).

Smoked Salmon Chowder Recipe

Boundary Bay Brewery

Bellingham, WA

Submitted by: Brittany Koenker, Placed at WSP SLO Office

3.5 cups diced potatoes
2.5 cups diced carrots
3 cups onions, chopped
1 cup celery, chopped
1/4 cup garlic, chopped
1.5 cups clam juice
1.5 cups white wine
1.5 tsp dried thyme
1/2 cup butter
1 cup flour
6 cups heavy cream
1.5 cups smoked wild-caught Pacific salmon

Boil the vegetables in the clam juice, wine and dried thyme. Heat up the cream. Melt the butter in a pot and add the flour slowly to make a roux. Add the cream to the roux and stir. When the vegetables are soft, and the cream/roux mix is warm, add the cream/roux to the vegetable pot. Add the salmon. Let it cook for a few more minutes. Cheers!

Alumni Spotlight

Amber Villalobos

Year 15 - CDFW Hopland
Year 16 - CDFW Fort Bragg

Q: What was your WSP member experience like?

Amber Villalobos (AV): Watershed Stewards Project (WSP) offers diversity in the WSP member professional development and general duties. General duties and professional development (when I was in WSP) included: education, outreach, volunteer organization (via ISP) as well as Swift Water Safety, ATV training and safety, Wilderness First Aid, CPR and networking. Through my terms I was cold, sweaty, covered in fish slime and water, low low income, going cross eyed writing habitat reports, camping, hiking in places out of public reach, climbing ropes, tagging, riding ATV's, snorkeling, trapping, walking, kayaking, sliding, not topping my waders and generally having a great time.

Q: Was there one experience that was especially memorable? Why?

AV: Many experiences during my terms as a WSP member are memorable, there were river otters, zombie fish, stuffed sculpin, baby raccoons, fighting raccoons, a half dead cat, city deer, metal clip boards, getting named as a scientist, cultural enlightenment, laughter and amazing cohorts. Yet, there is the first time I handled an adult Pacific Lamprey. Adult Pacific Lamprey are big slimy, unattractive creatures with beady eyes and many teeth. I don't often scream, but I did the day I was required to process one. Today, I still think Lamprey are repulsive, regardless they are a species of importance to other cultures and the California ecosystem (as appropriate).

Q: What are your title and responsibilities in your current job?

AV: Environmental Scientist (Project Manager) for Water Quality Certification Program in the Division of Water Rights at the State Water Resources Control Board (State Water Board). In my position, I craft and manage Federal Energy Regulatory Energy Commission Hydroelectric Project and Water Rights related Section 401 Water Quality Certifications (Water Quality Certifications) and California Environmental Quality Act (CEQA) documents (if applicable) throughout California.

The State Water Board and the nine Regional Water Quality Control Boards (Regional Boards) hold the authority and responsibility to protect water quality; balance competing demands; resolve water disputes; allocate water rights; develop statewide water protection plans; and establish water quality standards. Each Regional Board is responsible for developing the Basin Plan for its area. Basin Plans describe and list the beneficial uses of waters in a region, and establish water quality objectives and discharge prohibitions or limits, to protect and achieve water quality standards and goals.

The State Water Board has independent regulatory authority to condition the operations Federal Energy Regulatory Commission (FERC) hydroelectric projects to protect water quality and the beneficial uses of hydropower project reservoirs, lakes, and stream reaches. The State Water Board is the only state agency with the authority to issue a water quality certification pursuant to section 401 of the Clean Water Act for new or amended licenses to FERC hydropower projects.

Amber heading to the helicoptor for a project tour.

Photo from Amber's current position with the State Water Board. The black mass are Spring-run Chinook holing in a pool on Butte Creek in 2013.

As a sole water quality certification agency staff member, I am actively engaged in hydroelectric project relicensing, and post license issuance. During relicensing and the term of the license I (1) conduct complex environmental assessments on issues related to hydroelectric and water resource projects; (2) perform scientific field and office investigations; (3)collect and interpret environmental information and data relating to fish , wildlife, recreation, vegetation, stream flow, aquatic and riparian species habitat, and any other topic related to Basin Plan standards and beneficial uses; (4) provide comments on the technical and regulatory accuracy and completeness of environmental and regulatory documents to the applicant, other agencies, FERC and other stakeholders; inform stakeholders and other agencies of Basin Plan standards and listed beneficial uses; (5) direct, manage and review studies performed by others; (6) analyze construction and operation of hydroelectric projects; (7) recommend mitigation measures or alternatives; (8) collaborates with federal and state agencies, and other stakeholders; (9) prepare and/or direct and supervise the preparation of environmental documents required to satisfy the CEQA; (10) conduct inspections and enforcement actions regarding water quality certification violations or complaints; (11) develop and manage contracts, budgets, work plans, and scope of work; and (12) brief upper level management.

Q: How did WSP help prepare you for your work in the natural resources field?

AV: WSP provided scientific and cultural salmonid experiences unobtainable from any book or class. It provided a diverse opportunity to expand my knowledge regarding species diversity, monitoring, analysis, interpretation, report writing and so much more. Unlike many professionals, I have extensively handled, surveyed and interacted with salmonids and other fish species in their native habitat. This hands-on experience provided a leg up on evaluating environmental documents. I have also interacted with other cultures that value various fish species differently than my own culture. The one on one exposure to other cultural values expanded my value of fish species (e.g. scary slimy Pacific Lamprey).

Q: How does your work now differ from what you did with WSP?

AV: While duties in my current position are very different than WSP duties, I apply knowledge and experiences from WSP to my current duties. While I am not in the field, I am certainly aware of field tech limitations, possible issues with proposed monitoring protocols and reports, as well as time and facilities required for completing a study. As a WSP member, approximately 75% of my time was dedicated to field work that included, biological surveys (aka getting paid to ATV, Kayak, and hike in amazing scenery rain or shine) while the other 25% was office work that included data analysis, report writing and other duties as required. Today, I am desk and meeting bound and I evaluate the science that I once performed and more.

Q: What advice would you give current WSP members?

AV: If this is your first term and you hope to perform another year of WSP, apply to a new site that is performing different duties than your current site. While familiarity may be comforting, challenge yourself, build your skill set, build your resume, build relationships.

If this is your first or second term, be conscientious of your conduct. The environmental community in California is small. The salmonid community is even smaller.

Left: Amber performing instream flow monitoring on the Russian River with mentor, Dan Resnick; **ABOVE:** The three amigos in Fort Bragg, Year 16; **RIGHT:** Habitat typing

Fish Food

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

The Wonderful World of WSP

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