

HUMBOLDT AREA SALTWATER ANGLERS

A VOICE FOR SALTWATER SPORTFISHERS

2021 SUMMER NEWSLETTER

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The mission of Humboldt Area Saltwater Anglers is to represent North Coast fishermen's historic and ongoing right to sport fish along the Northern California coast; advocate reasonable and rational sport fishing seasons and regulations; educate our members and the general public about the economic and cultural contributions of sport fishing to our local economies; and promote sustainable stewardship of the resource.

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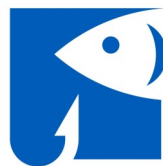
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HASA would like to expressly thank our friends for their time and contributions to our newsletter .

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This is issue #44.



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President's Message



Sometimes, just when we're feeling a bit complacent, something surfaces which reinforces just why HASA and similar organizations will always need your support. As I write this, two hours to the north of us I suspect some of you are chasing albacore out of Brookings. At the same time, others in Oregon are pushing to qualify a frightening ballot measure for the 2022 election cycle. This effort is apparently led by "End Animal Cruelty", an animal rights activist group. The Oregon Attorney General's office provided the following short title to the proposed ballot measure IP-13, "Prohibits injuring or killing animals, most breeding practices; self-defense exception. Redefines animal abuse crimes." Now for anyone not interested in reading the fine print, there might not be much to vote against. After all, who isn't against intentionally injuring or abusing animals? One might think this is aimed at serial murderers of neighborhood pets. But for someone who does take the time to read this ballot proposal, the title suggested by the Congressional Sportsmen's Foundation is far more accurate. Their suggested summary title, based on the proposed measure's content is, "Criminalizes hunting, fishing, livestock breeding/slaughter, animal breeding. Reduces conservation funding; limits science-based wildlife management." Yes, you read that right.

In Oregon, as in most states, fishers and hunters provide millions of dollars per year in license fees for the Department of Fish and Wildlife. Oregonians pay an 11% excise tax on sporting-related goods which also funds wildlife management, conservation, and research efforts. In fact, last year in Oregon alone these fees amounted to about \$50 million, and the taxes something like another \$25 million. Combined, that was nearly half of ODFW's 2020 budget. So, while posing as one thing, this bill is actually an attempt to outlaw fishing, hunting, livestock production, rodeos, pest control, wildlife research, and who knows how many other activities.

If this could gain traction in Oregon, where most of the state is rural, yet ruled from Portland, could it happen in California?

HASA has always and will continue to actively represent and protect your interests when it comes to fishing. On August 12 there was an on-line discussion hosted by CDFW concerning California halibut. When I moved to Eureka 35 years ago chasing California Halibut in the bay was either a secret I was unaware of, or it simply didn't exist. Now it's a popular option to offshore fishing, and the state has taken note of that fact. I was proud to note that of the 48 participants from the entire state, I could identify five from HASA.

Switching subjects, working within covid-induced constraints, we're still trying to arrange an informal fall potluck and minor fund raiser. We're trying for Sunday afternoon, October 3. Keep your calendar clear in the event we are successful.

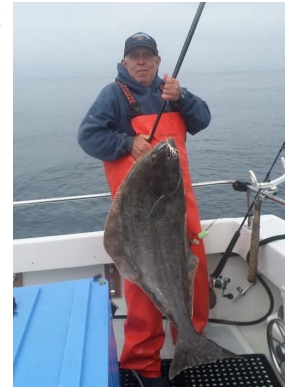
Till then, I hope to hear you offshore.

2021 Summer Groundfish Update

Tom Marking, HASA GAP representative

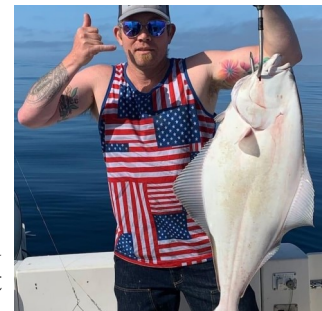
PACIFIC HALIBUT

The halibut season was our one bright spot this year...right up to the point where we got shut down. Once again, the success rate on Pacific halibut was really good with plenty of fish when the weather allowed. The closure came suddenly, with only about 30 hours notice. That doesn't seem very fair to the Charter folks who have people in route, only to find the season is closed upon arrival. That system needs to be better thought out on the regulatory process. Like last year, there was an abundance of small halibut, but they seemed to be a bit larger than last year. I would guess that 15-18 pounds was a good average of the fish landed. I don't know how many halibut got measured by the CERF samplers or if the poundage was based upon the five year average from 2014-2019 like last year. I never saw a sampler at the dock this year, so I'm not sure what the protocol was. I have asked for an explanation from the Department, but none has been offered



at this point. I suppose it will be explained at the September Pacific Fishery Management Council meeting to be held the 8th -15th. Unfortunately, the International Pacific Halibut Commission (IPHC) has no plans to survey the California area within the next three years, so this cohort of young halibut that have moved into Southern Oregon and California has yet to be officially recorded and acknowledged. That would increase our abundance and give us a bit more leverage to try to get our allocation increased. It will be a tough go at the PFMC, since Washington and Oregon do not want to give up a share of their quotas, even though some of that is derived from the California assessment. We will keep trying, but I don't see any changes in the near future.

The IPHC has finished with their Management Strategy Evaluation (MSE) process that I was involved with for the past nine years, but it is uncertain how the Commission will use the MSE report on future management. It basically came down to an arm wrestling match between Alaska and Canada on how to apportion the stock. The 2A area (the Pacific States), with leadership and major effort from the Washington Treaty Tribes, pushed for and got a 1.65 M pound annual allocation for the past three years. Whether this amount is incorporated into the Management Guidelines will remain to be seen, but my bet is it will be a floor amount that will remain constant for us.



GROUND FISH:

The groundfish effort was less than normal this year due to rough weather and a poor salmon season that typically brings in outside anglers. I don't expect to see very high harvest values for rockfish this year, but we won't find that out until much later in the fall. One of the assessments done this summer may cause





trouble for us. The Quillback/Copper rockfish assessment was very contentious with Quillback rockfish being assessed at 14% and Copper rockfish at 39.3% of unfished biomass. Since 25% is the trigger value, Quillback is a serious problem. This will be discussed more in the next few weeks and management decisions will need to be made by November on how to manage the stock going forward. At the very least expect to see no retention of Quillback and maybe Coppers also. This is vexing, since

half of their habitat is off limits to anglers being located in RCA's, MPA's or Sanctuary zones (so how can it be overfished?); but since the data are scarce, the Science folks are very conservative until they see more data. This has gotten to be a problem with the assessments. No data is being collected in deeper areas, MPA's or closed zones, so they don't really know what is out there.



The Vermilion/Sunset rockfish assessment was completed just last week and turned out to not be as bad as feared. The stock is 43% of the unfished biomass in the North and 48% in the south, both areas above the Management Target of 40%; so that is very good news. This complex has been harvested way over the Overfishing Limit for the past few years, so there was a lot of anxiety. Bag limits were reduced this year over concern they might be overfished and might have been reduced to below the Minimum Stock Size Threshold; but that does not seem to be a problem at this time.



The November meeting will discuss this complex in more depth and set a Management Procedure to assure the stock is kept in a healthy state.



As some of you are aware, the California halibut was assessed just last year, and a "staged management" process is underway to work with the stakeholders on how to manage this species. The first meeting was held last week and several HASA members were on the webinar. Very little data is available for the areas north of Pt. Arena, so we will have to keep on top of this to see where it goes from here. There are supposed to be three webinar meetings to gather information from anglers, commercial guys, and the general public on what is important to them and what they are most concerned about. We will keep you posted on this process.

The tuna season started a few days ago and a sizeable contingent from Humboldt went up to Crescent City for a few days of tuna fever. Lots of fish were caught ranging in size for 8-35 pounds. Hopefully, the wind machine will back off and we can get some action down here in our area.



Tight lines folk!

Federal Drift Net Ban Legislation

Submitted by Larry DeRidder

Nixed by President Trump last winter, both the House and Senate are again considering a bill to phase out large-mesh drift gill nets. If passed by both houses and signed into law, this would phase out such nets in five years in US Federal waters out to 200 miles offshore. These nets are commonly a mile or more long, hang 200 feet down from the surface, and are left to drift overnight targeting swordfish and thresher sharks. Numerous other species are often entangled. Large-mesh drift gillnets are already banned in the U.S. territorial waters of the Atlantic Ocean and the Gulf of Mexico, as well as off the coasts of Washington, Oregon, Alaska, and Hawaii. The United States is also a member of international agreements that ban large-scale drift nets in international waters. However, for some reason they remain legal in federal waters off the coast of California. California has already initiated a program to buy back gill nets and the associated permits from commercial fishers. The proposed federal legislation similarly provides funding to assist affected commercial fishers to convert to alternative catch methods less likely to result in bycatch. Many commercial fishers have already voluntarily converted to deep-set buoy gear.

A press release from the office of Diane Feinstein, who is a sponsor of the legislation, states “The bill would phase out the use of the nets and help the industry transition to more sustainable methods like deep-set buoy gear that uses a hook-and-buoy system. Deep-set buoy gear attracts swordfish with bait and alerts fishermen immediately when a bite is detected. Testing has shown that 94% of animals caught with deep-set buoys are actually swordfish, resulting in far less bycatch than drift gillnets. A seven-year study by the Pflieger Institute of Environmental Research found that fishing vessels using the new deep-set buoy gear caught 83% more swordfish than those using traditional large-mesh drift gillnets. Also, because vessels are alerted as soon as there is a bite, swordfish are transported to markets faster than with driftnets, resulting in higher-quality products that bring a higher price.”

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Salty Stories from Captain Phil

I had the pleasure of sitting down with Phil Glenn for a few hours recently to get some stories to include in the newsletter. I tried to write down key points so I may have missed a couple of things or not gotten them quite right, but I think these are pretty close. I am hoping this will encourage some of you to submit your stories too. I just included a couple of the stories he told me and hope to include more in the future – Joe Polos, Newsletter Manager

Never Take the Bar for Granted

Early on as the Captain of the Celtic, Phil took two customers salmon fishing. There were four on board including the deckhand and himself. The ocean was a little rough, but the fish had been biting and the two customers wanted to give it a go. They motored out through the bar; it was sloppy but OK to get to the fishing grounds. Once they were fishing the bite was good and within 45 minutes they had limits of silvers (this was awhile ago when you could keep silvers). Low tide was at 9 in the morning, so they waited for the tide to change. The bar looked OK at the change of tide with the swells breaking along the north side of the channel. As he started to approach the entrance of the bay it seemed like your typical entry into the bay, just a moderate swell.

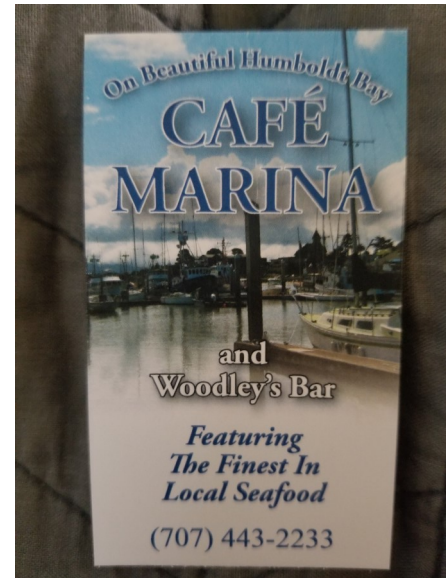


Suddenly, a very large swell came up behind the Celtic and lifted the stern up high. Phil pulled back on the throttles to prevent the Celtic from surfing the swell. The Celtic started to surf down the face of the swell but eventually the crest of the swell passed the boat. But as he looked back to see what else was out there, a bigger swell starting to crest was at the stern of the boat, starting to pick it up. He yelled to the deck hand as the wave picked up the boat and it started surfing down the face of the wave. Phil was worried about the boat turning sideways but it surfed down the wave straight but wasn't slowing down. As the Celtic reached the trough, its bow buried into the water until the top of the cabin windows, which were about 12 feet above of the water line, were under water. One window was completely blown out, one was hanging off its hinges, and all the radios were destroyed from the water that rushed into the cabin. He had one to the clients, both of whom were sitting in the cabin with him, yell out to the deck hand who had been cleaning fish on the deck. At first there was no response but then he yelled back that he was OK. Below the fish cleaning table was the fish hold which he dove into when he saw the wave coming. Once the wave passed the Celtic, Phil, making sure there wasn't another large wave turned the Celtic around and headed out to the bell buoy. He had the deckhand check the engine room and galley for water and everything was OK. They headed out to the whistler and waited about 45 minutes for the flood tide to be further along. Another boat, the Dow Jones, was passing by so Phil waved him down on told him that he lost his radios and that he would follow him in. The Dow Jones went in slow, probably thinking the Celtic had other problems, which isn't what Phil wanted – he just wanted to get into the harbor.

Fortunately they made it back to the dock safely with only a couple of broken windows, ruined radios, and one of the client's jacket that washed out of the cabin and lost.

Later, another friend of Phil's found several lifejackets floating and was worried that the Celtic had sunk. The jackets were stored in the bench seats on the deck and as the deck was awash, the lids of the seats were lifted, and the jackets floated off. Phil was able to contact him and tell him the story – and get his life jackets back.

A general rule of thumb on crossing the bar: If the swell at buoy 22 is less than 8 feet, conditions will be good to cross the bar on a flood tide and probably on ebb tide. If the swell at buoy 22 is greater than 8 feet, crossing the bar will probably be OK on the flood tide and maybe on the ebb tide. If the swell at buoy 22 is greater than 10 feet, you should not try crossing the bars on ebb tide. It is important to remember, it is not a guarantee that conditions will be all right during a flood tide so **always be watching.**



Old English saying: “Those who are not afeared of the sea shall surely be drowned. Those who are afeared of the sea shall only be drowned now and again.”

Word Gets Out About California Halibut in the Bay

Quite awhile ago, Phil's friend Ken Bates was going on a trip to southern California and Phil asked him to pick up a lampara net if he could find one for a reasonable price. They would split the cost and try to start up a live bait business in Humboldt Bay. When Phil fished out of SF Bay, live bait was a big thing. Ken got the net, they built a couple of bait receivers at Woodley Island marina and started their live bait business. Unfortunately the salmon season that year was cut short, so not a big local demand for live anchovies. They also tried freezing and selling frozen anchovies with limited success.



A few events coincided that got Phil to try California halibut fishing in the Humboldt Bay. A fishing article in the San Francisco Chronicle about the great halibut fishing on the Berkeley flats in San Francisco Bay using live



anchovies, which included a description of how to rig up for live bait fishing. The second event was word got around that some of the Coast Oyster employees were fishing for halibut in the Bay. At the time, Coast Oyster conducted depredation trawling in the North Bay to remove bat rays. Other fish were returned and there were enough halibut caught to encourage the guys to go fishing for them. The third event was Phil had a rockfish charter scheduled for about a dozen guys, but the weather was bad. Phil told them they could reschedule, probably have to mow the lawn when they got home, or they could give halibut fishing in the Bay a try. He told them he had

not fished for halibut in the Bay so he didn't really know what he was doing other than what was in the article, what he had heard through the rumor mill about the Coast Oyster guys, and they had live anchovies. He told them he wouldn't charge them if they didn't have fun. So they headed up into the North Bay and had some fun, nobody asked for a refund. They caught about 5 legal halibut, a dozen or so shorts, smoothhound dogfish, maybe a soupfin shark, some bullheads, and some clam shells. The next week he tried it again and charged \$10 less to encourage customers to try. That trip they caught about 20 legal sized halibut, 25-30 shorts and an assortment of other bay fish. The next week there were no discounts.

Once word got out more people started heading to the North Bay to fish for halibut. One of the reasons it really exploded was that the person hired to sell live bait liked to talk a lot on the radio and spread the word about the great halibut fishing using live bait. At the beginning, it was just local boats fishing because since the salmon season was closed there wasn't the influx of fishers from the Central Valley that typically occurs during the summer. But once word got to them, they headed over the hill and soon the North Bay was packed full of boats drifting along the channels, trying to stay out of each other's way and catch some halibut.



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A silhouette of a person standing on a rocky shore, holding a fishing rod. The background is a sunset over the ocean, with the sun low on the horizon, creating a warm orange glow.

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Betty's Raw Apple Cake

Recommended by Larry DeRidder

It's Fall, and that means it's apple season on the north coast. The following easily prepared recipe is courtesy of Sara Smith of Fieldbrook Valley Apple Farms. Their Apple Barn is open to the public, and they have about 50 varieties of apples available. You can find them at 336 Rock Pit Rd. Fieldbrook CA 95519. Phone (707) 839-4289.

1 cup oil	½ teaspoon salt
3 eggs	1 teaspoon baking soda
2 cups sugar	1 tablespoon cinnamon
4 cups apples (cut into big cubes)	2 teaspoons vanilla
3 cups flour	

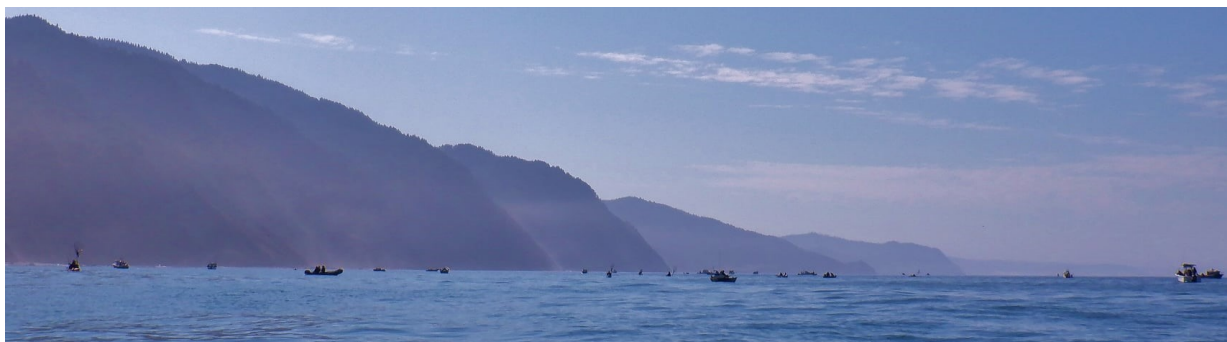
Mix flour, salt, baking soda and cinnamon. Add all other ingredients until the batter is moist. **The batter will be thick!** Pour into an ungreased 9 x 13 pan or cupcake pan. Bake at 350 degrees for 40 minutes (cake) or 325 degrees for 30-35 minutes (cupcakes).

Icing

8 ounces of cream cheese
2 ½ cups powdered sugar
1 teaspoon vanilla
½ cup butter

Mix ingredients and apply frosting.

Enjoy following your favorite fish dinner.

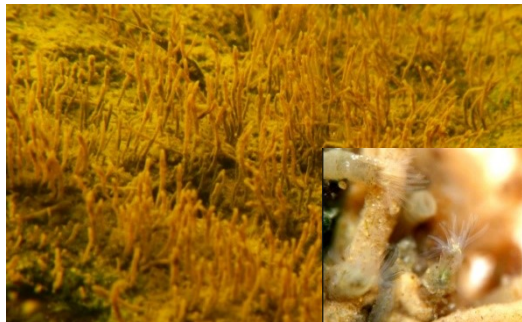


Juvenile Chinook Salmon Disease Problems on the Klamath River

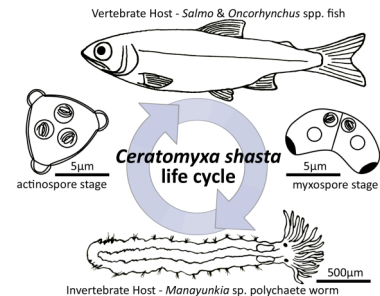
Joe Polos, HASA Salmon Representative

Earlier this year many of you may have heard of the significant juvenile Chinook salmon disease problem on the Klamath River. One report stated that in early May, 97% of the juvenile Chinook sampled by the Yurok Tribe's Fisheries Department were infected and over a two week period 70% of the juvenile salmon captured were dead ([In Klamath River Drought, a Massive Juvenile Salmon Die-Off \(undark.org\)](#)). Unfortunately, 2021 looks like it is going to be another devastating year for juvenile Chinook salmon production from the Klamath River due to infections of *Ceratomyxa shasta* and *Parvicapsula minibicornis*. Drought conditions coupled with water management that has typically not favored juvenile salmon below the Klamath River dams have set up optimal conditions for the fish disease pathogens and stressing juvenile salmon making them less able to fight the diseases.

The juvenile Chinook are being infected by two microscopic parasites that are endemic to the Klamath River, *C. shasta* and *P. minibicornis*. These parasites have a life cycle that requires two hosts, a salmon and a polychaete worm. The polychaete worm (a distant relative of pile worms), *Manayunkia occidentalis*, is also endemic to the Klamath River and the filter-feeding adults are about an 1/8 inch long (inset below). The polychaetes congregate



in large colonies in the river and can become very abundant (picture to the left) when there is little disturbance to the river, which would typically occur during high winter flows. The current water management of the upper Klamath and drought have created favorable conditions for the polychaete to thrive. When adult salmon that were infected as juveniles return to spawn they shed myxospores into the water as they decay following spawning. The



myxospores infect the polychaetes where they develop into actinospores which are released into the water and infect juvenile salmon. The two parasites affect juvenile salmon in different ways. *C. shasta* causes hemorrhaging and necrosis of the intestine while *P. minibicornis* accumulates in the kidney, causing minor inflammation in lightly infected fish to necrosis of the kidney in highly infected fish. Often diseased fish will be infected with both parasites.

Depending on the severity of the infection and the health of the fish, some will survive to adulthood to complete the parasites life cycle while others will not. Mortality can be very high for juvenile Chinook infected with large numbers of actinospores. The fish in the figure to the right exhibits bloating that is characteristic of a severely diseased fish with failing intestine and kidney function; this condition leads to quick mortality.



The USFWS Fish Health Center, working with USFWS-Arcata Office, Karuk Tribe and Yurok Tribe, conducts annual monitoring of juvenile salmon infections of *C. shasta* and *P. minibicornis*. As of August 2, 57% of the sampled Chinook were infected with *C. shasta* and

64% were infected with *P. minibicornis* ([CA-NV FHC Klamath River Monitoring July Update.pdf \(fws.gov\)](#)). Weekly infection rates are highly variable through time and by area as shown in the infection rate data, ranging from 0% early in the year to 100% later in the year (Table 1).

The infection rates during the peak outmigration of juvenile Chinook on the Klamath River (May-July) have been used as a measure of annual infection that can be compared across years. Over the past 10 years, infection rates of *C. shasta* have ranged from 17% in 2011 to 84% in 2015 and infection rates of *P. minibicornis* ranged from 48% in 2011 to 97% in 2015 (Figure 1). While being infected does not mean a fish is destined to die (the severity of the infection has a large influence on survival), the high infection rates with poor water quality conditions are very detrimental to the productivity of Klamath Chinook.

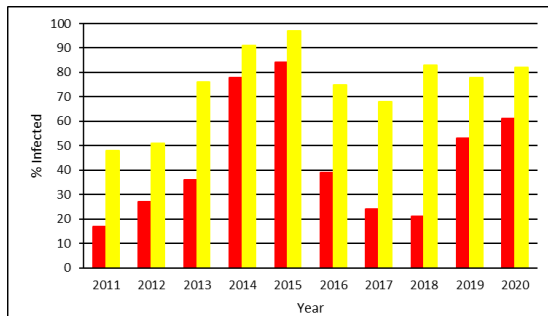


Figure 1. Infection rates of Klamath River juvenile Chinook salmon by *C. shasta* (red) and *P. minibicornis* (yellow) during the peak outmigration period of May-July.

Table 1. Weekly infection rates (%) of Klamath River juvenile Chinook Salmon by *C. shasta* and *P. minibicornis* by sampling area, 2021.

Week	<i>C. shasta</i>			<i>P. minibicornis</i>		
	Shasta R. to Scott R.	Scott R. to Salmon R.	Salmon R. to Trinity R.	Shasta R. to Scott R.	Scott R. to Salmon R.	Salmon R. to Trinity R.
21-Mar	0			0		
28-Mar	3			0		
4-Apr	0	10	56	0	0	33
11-Apr	15	0	60	17	0	25
18-Apr	43	25	0	58	35	0
25-Apr	78	71	45	88	95	36
2-May	97	81	75	100	71	38
9-May	98		83	100		88
16-May	67	75	95	100	100	100
23-May	81	68	100	100	100	90
30-May	100		85	100		100
6-Jun			76			90
13-Jun			78			80
20-Jun			75			75
27-Jun			63			58

More information of juvenile Chinook disease in the Klamath River can be found in the annual reports from the Fish Health Center: [California-Nevada Fish Health Center, Fish and Wildlife Service \(fws.gov\)](#).

The bad news is that it's likely fishing in the KMZ will continue to be constrained in the future due to the low population level of Klamath fall Chinook. The below minimum natural spawning escapement in the past 5 of 6 years (it will likely be 6 of 7 after this year) and the juvenile disease problems will continue to suppress the Klamath fall Chinook population.

On the other hand, the Klamath Dams, that contribute to the poor river conditions and the disease problems, are scheduled to be removed next year. See our article on Klamath Dam removal in the winter 2020 HASA newsletter ([HASA-Winter-2020-Newsletter.pdf \(humboldtasa.com\)](#)). Recently, NOAA predicted there is a 70% chance of a La Nina this winter ([Climate Prediction Center: ENSO Diagnostic Discussion \(noaa.gov\)](#)).

This weather pattern typically brings wetter than normal winters to the Pacific Northwest which would be a welcome change. Fortunately salmon are very productive and when the conditions are right, such as some good wet winters coupled with strong spring upwelling, the Klamath Chinook population can quickly rebound ... we just need some good wet northern California winters coupled with those strong spring north-westerlies to kick upwelling into high gear. And, of course, a decent level of juvenile Chinook production to take advantage of the good conditions.



Tuna Species of the U.S. West Coast: A Photographic Identification Guide

For those of you that have been out chasing tuna, or wishing you were, NMFS published a neat concise summary of the biology and ecology of tuna species found along the West Coast that might interest you: ([Tuna Species of the U.S. West Coast: A Photographic Identification Guide \(noaa.gov\)](https://www.noaa.gov/species/tuna-species-of-the-u-s-west-coast-a-photographic-identification-guide)).



Notes from Newsletter Manager: In our continuing quest to make this newsletter more interesting to our membership we will continue to ask for article ideas and pictures from the HASA membership. I can be reached at jcphasa@gmail.com. The deadline for submission of materials for the 2021 Fall newsletter deadline will be somewhere around early November. Please contact me if you have any questions.

We are also looking for additional advertisers for the HASA newsletters. Our newsletter is sent out to hundreds of anglers each quarter and posted on our website, so it is a good place to advertise your business. Email hasa6191@gmail.com if you or a colleague is interested in advertising in our newsletter; we can provide rates for different sizes of ads from business cards to full page.

Thanks, Joe

Cable Car Tuna Casserole and Cucumber Crab Boats

Recommended by Joe Polos

Almost 40 years ago my girlfriend (now wife) and I took a seafood short course at HSU; I think sponsored by the Humboldt Fisherman's Marketing Association and Sea Grant. Here are a couple of recipes that sound good; but I haven't tried them yet. Hope you enjoy.

Cable Car Tuna Casserole

12 oz. egg noodles, cooked <i>al dente</i> , drained	½ cup mayonnaise
15 oz. cooked tuna, drained and flaked	½ tsp. thyme
1 – 10 oz. can of cream of celery soup	¼ tsp. salt
1 cup coarsely chopped celery	½ cup of milk
⅓ cup coarsely chopped green pepper	¾ cup grated sharp cheddar cheese
⅓ cup sliced water chestnuts	¼ cup of chopped toasted almonds
⅓ cup chopped green onions	

In a two-court casserole dish, combine noodles, thyme, and salt. Set aside. Mix soup and milk in a saucepan; heat stirring constantly until smooth. Add tuna, celery, green pepper, water chestnuts, green onions, mayonnaise, and all but 2 tbs. of cheese to the saucepan. Heat and stir until cheese is melted. Add to casserole dish and mix thoroughly. Sprinkle with remaining cheese and almonds. Bake for about 20 minutes at 425°F, until bubbly and lightly browned. Serves 6.

Cucumber Crab Boats

1 cup Dungeness crab meat	1 tbs chopped parsley
3 cucumbers	1 tsp dill weed (or to taste)
1 cup mayonnaise	½ cup minced celery
½ cup chili sauce	Seasoned salt and pepper (to taste)
1 tbs lemon juice	

In a small bowl mix mayonnaise, chili sauce, lemon juice, seasoned salt and pepper, and minced celery. Add Dungeness crab meat and mix well. Peel cucumbers, cut in half and hollow out seeds. Fill cucumber boats with crab mixture and chill. Top with freshly chopped parsley and dill weed, if desired. May also substitute avocado halves for cucumbers.



For a Good Bite!
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Hold the Anchovies: Thiamine Deficiency in Sacramento River Chinook Salmon

Joe Polos, HASA salmon representative.

I have never liked anchovies on my pizza, but my wife used to. Maybe my aversion to eating anchovies was developed in my youth when fishing off the piers in San Francisco with a bag of anchovies, slowly rotting in the sun; boy did they stink by the end of the day. But on a more serious note, Chinook salmon returning to the Sacramento River in 2019 were afflicted by thiamine deficiency complex (TDC). TDC was discovered at several Central Valley hatcheries by observations of juvenile fish swimming in circles and higher than normal mortality rates. There were also observations in some Central Valley Rivers of higher juvenile salmon mortality, possibly also caused by TDC. The cause of this was determined to be a deficiency of thiamine, Vitamin B1, which is typically passed on through the adults. So why is it so bad to eat lots of anchovies if you're a salmon? Anchovies produce an enzyme, thiaminase, that breaks down thiamine. So salmon that eat primarily anchovies do not get enough thiamine and, for the females, not enough thiamine is incorporated into their eggs to be passed on to their young.

Fishery scientists believe TDC was caused by Central Valley Chinook eating primarily anchovy off the central California coast. This hypothesis was supported by oceanic surveys in 2019 that indicated the highest abundance of anchovies since the surveys began in 1983 and other salmon feed such as krill were at exceptionally low levels. Fishermen also observed that salmon they caught along the central California coast had mostly anchovy in their stomachs. Limited surveys conducted in 2020 indicated the salmon forage-base was again dominated by anchovy.

Fishery scientists found TDC did not occur in salmon that had egg thiamine levels above 5nmol/g and it appeared that late fall, winter, and spring Chinook salmon from the Central Valley were more affected. TFC was also found in Coho Salmon from Iron Gate Hatchery on the Klamath River. Once hatchery staff determined juvenile were suffering from TDC they were treated in thiamine baths and the fish recovered their swimming abilities. But they caution that this does not mean there were not long-term health impacts due to thiamine deficiency while eggs were developing. Additionally, the extent TDC affected naturally produced fish is unknown and possibly another factor contributing to decreased natural salmon production.

While the cause of TDC appears to be related to ocean food web dynamics, it just is another factor that salmon populations must deal with, in addition to poor inland conditions; both natural such as droughts and manmade such as perpetually low flows due to politically motivated water management practices.

Fortunately, early reports from Monterey this April indicate Chinook were full of krill and squid.

(This article was originally going to be in the spring newsletter but there wasn't enough room so here it is now)



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