

Sacramento Perch feat. Peter Moyle and Max Fish

Hey to all you fish enthusiasts out there. Whether you're an avid angler or just curious about fish, we'd like to welcome you to Fish of the Week!, your audio almanac of all the fish. It's Monday, February 6 2023. And we're on a week by week to our fish across the country with guests from all walks of life. I'm Katrina Liebich with the US Fish and Wildlife Service in Alaska.

And I'm Guy Eroh. And this week, we get to do one of the species has been on the very top of my list since they started doing this show. One of the most intriguing species I think, just kind of flying under the radar, it's the Sacramento Perch.

I'm very pleased to welcome our guests, we've got Peter Boyle and Max Fish, both of whom are joining us from California. So Peter's a distinguished Professor Emeritus at the Center for Watershed Sciences at UC Davis. Max is an Environmental Scientist with the California Department of Fish and Wildlife. And, Max, you have quite a perfect name for the show by the way, I wanted to compliment you on that.

I did not actually think that that was his real last name. I thought that was just like a moniker that he had. But that's awesome.

I get that pretty frequently.

And Peter, I was gonna point out to you, I went to Virginia Tech, and I was getting my biology undergrad and we had your textbook. So I was carrying that thing around a lot...Moyle and Cech. I recognize the name. So I was pretty pleased that your name came up when we were looking for Sacramento Perch.

I'm sure you're a better person for having read it.

That was awesome. So yeah, we're very appreciative to both of you for joining us and looking forward to getting to know this fish. So welcome.

To help our listeners get grounded for the conversation to come. I liked to start by asking one or both of you to help us imagine what it would be like to be on a bank in California standing in ideal Sacramento purchase habitat and whether it's the past or the present. Say we have one of these fish in our hands. What would stand out in terms of its body shape, mouth placement, color, texture, basically anything about its outward appearance, that would be helpful to have in mind as we uncover the story of this fish.

The first description of the Sacramento Perch was during the Gold Rush era of as described by a doctor in the Placerville Times in a newspaper.

Huh.

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He's the one who named it. And it didn't really explain why he called things the way they did. But got this fish into the literature that newspaper article then. It was reprinted and by the California Academy of Sciences in one of their journals, and it became an officially recognized species.

That's cool.

That's a real interesting history. You don't hear about newspaper articles in fish very often.

But just think about what California was like. 1849s into 50s. Suddenly, hundreds of 1000s of people were coming to California in places that had relatively low populations. And suddenly, some of the people coming out recognize that, hey, you've seen these fish in the markets nobody had ever described or seen before. So you know, basically if you're fishing for Sac Perch, and you catch one, what you see first is...it looks like a sunfish. A live fish has had a green and purple iridescence on the side. It's really hard to explain. It's really quite attractive. And the way that they swim around the bands on the side. Very long dorsal fins with a lot of spines in them which is we using that name is archoplites because first of all of those spines but as I say it does go under the radar because it's not spectacular. So many fish are.

It kind of reminds me of a crappie with its mouth so it kind of a crappie bass looking thing. I mean this isn't actually a perch, right, in terms of looks.

Reminds me a lot of another of my favorite ones which is the ambloplites he's not the archoplites...the rock bass is it kind of in there? Because yeah, you also see that indented kind of forehead kind of like the crappie so I'm kind of curious where in the Centrarchidae these things fall?

When I first came to California so I thought too it look like rock bass. Some experiments show they can hybridize with rock bass. They're in the sunfish family, the Centrarchid family along with the bass and the sunfishes. And they've been isolated by themselves out here in California for several million years. So they're long-assumed to be sort of a primitive sunfish, but turns out they're not. They're related to the rockbasses and similar species. Their long isolation shows and they're very distinctive morphology and distinctive appearance. But genetically it's relatives in the Eastern US

In terms of the Latin name, Guy's obviously really into the Archoplites. But what does Archoplites mean?

Archoplites interruptus. Archoplites means spiny anus. The fin spines are right there at the end of the anal fin.

Spiny anus interrupted line. That's memorable. And then could one of you just describe quickly Centrarchids - what fish those include, and which fish this one is most closely related to?

That's quite a name.

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Interruptus is I think, related to the lateral line which is somewhat interrupted/not complete on a lot of these fish

Basically, the Centrarchid family is one of the most common and widely distributed fishes in North America. It's a North American fish family. So it's very special to the US. Of course, the things like largemouth and smallmouth bass have been introduced all over the world that to the detriment of native fishes and other parts of the world. But the family consists of the basses, genus *micropterus*, which includes largemouth and smallmouth bass, spotted bass and a whole array of endemic basses in the southeastern US. Includes the sunfishes, your genus *lepomis*, which are really, relatively small fishes that are widely distributed throughout the Eastern and southeastern US. And then a few odds and ends of pieces like the rock bass and fishes like that. But basically, it surpasses in sunfishes that make up most of the family. And those are the ones that are most familiar to people.

So that just kind of drives that point home that this is the only one native west of the Rockies. Like that's a lot of fish in that that very large family. So that's kind of why this fish is particularly cool.

That's correct. Yeah, it's very unusual. It's amazing it's surviving. You look at the history of the Central Valley, and look at the geologic history over the last million years, with severe floods and droughts and all this other kinds of stuff going on. And a number of other species disappeared, for example, there are fossil catfishes in this area, and they disappeared. All these dramatic events. The rise to the Sierra Nevada, for example, but the sac perch, hung out and managed to make it

Max, I want to make sure we get a really good picture of this fish for folks in terms of like, yeah, like what it looks like and also size.

Yeah, I was I was gonna say, regarding the distribution, their distribution does predate the Rockies in the Sierras. And so they've been, like Peter said, isolated for millions of years, and they're the only member of their genus, *archoplites*. But as far as appearance, I would agree they're probably most similar to a crop of the fish that people are most familiar with. They get pretty big looks like historically, they may have got to 24 inches long. Our California state record is I believe, three pounds 10 ounces from Lake Crowley back in 1979. But you know, there's reports of three pound plus fish coming in every year from Bridgeport reservoir and Lake Crowley. Now I had a friend who recently caught one that was almost three pounds out of Pyramid Lake so so they do get pretty big.

Okay, when you're finding these fish, are they typically in high abundance like someone can go out and catch a bunch of them? Are they kind of hard to come by?

You know, they're rare in their native range. They're found primarily in ponds, or you can find them in real abundance on places like Crowley reservoir, which is an alkaline reservoir on the east side of the Sierras outside their native range. And in fact, the reason the Sacramento Perch is not listed as an endangered species is in part because they're good enough game fish and they can survive and water more alkaline than most of the other Centrarchids can survive in. And so they were planted all over the western US for a while in fishless waters or waters that didn't have fish people appreciate it anyway. So

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while these perch populations got established in Nevada, Colorado, as well as in California, outside their native range.

And within California, is it primarily like the Central Valley where they were originally located or what was their original kind of endemic range in California?

Central Valley and the San Francisco estuary. They can help tolerate fairly high salinities. They are really abundant. When you look at the Indian witness. For example, in the Central Valley, the most common fishbones you find are the Sacramento Perch and then thicketail chub, which is a minnow. The Sacramento perch were obviously very abundant and pretty much appreciated by the Indian peoples. And then in the late 19th century before all the Centrarchids got well established, there was actually a commercial fishery for Sacramento Perch, primarily to feed Chinese people who were workers living in San Francisco and they really liked that fish.

How do they taste?

Oh, Sacramento Perch out great eating fish. I don't know if any of you eat any of the Centrarchids.

Yes, they're delicious

But I think they're right up there with crappie as being the best eating fish in the Centrarchidae. The white flesh. A little bit oily. So it really tastes good. It's just holds together well. Great tacos. I recommend Sacramento perch to anybody who wants to eat fish.

I love pan fish. And we don't have any up here in Alaska. So I'm always missing the crappies and bluegills and things like that.

What you have in Alaska is lots of salmon.

Yep. I eat a lot of salmon.

Having driven through the Central Valley fairly recently, I mean, it seems like things are probably a lot different than they were so I'm kind of curious what habitats they preferred or adapted to naturally and kind of how things have changed over time for them.

Like Peter said, Sacramento Perch were endemic to the estuary before it was altered and channelized. They were also endemic to Clear Lake and Lake County. So they were really well adapted to the sort of slow moving sloughs and streams and lake habitat where, you know, historically, their biggest competitors were probably steelhead in estuary and Pikeminnow and maybe Hardhead. So they really got to adapt to the conditions without having to adapt to a lot of unfamiliar competitors.

Also one of the things I'd like to add in there is that, I think there's no direct evidence for this, you know, I don't know about their biology and so forth, they probably were big utilizers of floodplains. Matter of fact, I would guess, that they live in all these sloughs and things that were in the Central Valley, which

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during the spring months would get to high flows coming out of the Sierras, the sloughs would dry up, the Sacramento Perch had to move out onto the floodplains. And I suspect they spawned out there. And they must have been very easy for the Native Americans to catch because they were so abundant in the middens and they were catching them primarily with nets and traps of various sorts. I imagine that they were really well adapted to this variable habitat in the Central Valley.

And a lot of times, it seems like water gets kind of controlled, and those floodplains get a little bit more heavily managed...

It's now mostly ag land. Not much habitat for fish.

The Sac Perch had a rough time in that the, as a probably a lot of native fish, you know, the end of the 19th century, early 20th century, they had commercial fisheries targeting them, they had their habitat being altered. And then they also had the introduction of other sunfishes in the 1890s. So a lot of different things working against them.

Still, it seems a bit strange to me, when you look at the profile, this fish, at least from what I've read about, it seems to be able to utilize a diversity of habitats. And it's got a diverse diet that it can use, it gets big, obviously, it's popular as both commercial and decently as a recreational species. It just fits the profile more of something that you'd see become invasive and not a species that you know, is confined to really small thermal tolerances, or something like that, that becomes endangered. So it just surprises me that over time, this fish, not only have things changed enough that it has gone down, but also that people have let it go down. And it hasn't just been spread around the country and gone off like gangbusters all over. So I'm kind of curious if you could describe a little bit more of what this trajectory looked like was it just in general is just kind of slowly curved down and it really drop off or what happened there? What's your perspective on that?

Basically, the decline of the Sacramento Perch in the Central Valley is coincident with the rise of the sunfishes with the non native Centrarchids in the Central Valley. It appears to me that the reason for this is that the Sacramento Perch is a real wimp when it comes to defending its nests and so forth. It's a nest building species just like a bluegill or pumpkinseed, but it doesn't defend the nests very strongly, it gets discouraged very easily. And they're colonial nesters and the nest before the other Centrarchids do. There used to...before the bluegill does for example. So they're building their nests and their larvae are coming up just to the time the bluegill are starting to spawn and the bluegill males then are out there foraging very heavily to bulk up for spawning. And these little Sacramento perch larvae just out there waiting to be eaten, so to speak. So the best scenario, I've come up with the disappearance of the Sac perch is that they simply could not compete with the nonnative sunfishes for reproduction. And nonnative fishes were also presumably predators on their larvae.

I think it's interesting, because when you hear that term endemic, your ear should really kind of perk up. I mean, this is clearly a species that, you know, is unique to a certain place. I mean, granted, people spread fish around, but I'm curious why you guys think other sunfish have been introduced, because it sounds like a really beautiful kind of large, cool species. What other species were brought in and what

do you think is driving just maybe folks not being as familiar with this particular species in current times?

As far as the valley floor goes, you know, green sunfish were introduced in 1896. And intentionally. And so much of the waters in the valley floor are all interconnected. And so anything that's fed by surface water on the valley floor sooner or later is going to have probably a whole host of exotic sunfishes and we've seen that in some ponds where we've tried to create preservation populations of Sacramento perch using surface water and even after screening you know, seven different screens of differential size the non native sunfishes eventually become established. And just like Peter was saying, you know, we usually see the effect on recruitment first, you know, well after non native sunfishes get established, within a year or two, you stopped seeing the young of the year Sacramento birds you'll still see the adults around but a matter of 5,6,7 years when those adults age out, you just see the population eventually succumb to the non natives.

going back to some of these ones, bass aside, what is it about these lake systems and ponds systems where the Sacramento perch are able to survive, but these non native sunfish can't really get established, what characteristics do they sort of have in common?

Well typically, the places where you find Sacramento perch in abundance are usually reservoirs that have water quality, that the non native species can't survive in. And the reason it survived in isolation in the Central Valley for millions of years was that it was able to live in this swampy valley floor region that had tremendous droughts at times. And that meant when water would have been confined to these lakes of various sorts would have gotten very alkaline, very salty. Sacramento perch probably also were out in the estuary where they could persist as well. So the fish became adapted essentially to living under very poor water quality, in terms of temperature and salinity, that the other Centrarchids could not survive in. And so that is what has kept them going. And the reason that people planted them all over the western United States, because he could put them in lakes the other sunfishes cannot survive in.

And then from a management perspective, are you trying to encourage people not just to be aware, are you encouraging them to go out and catch this fish?

Yep, I think both, you know, a lot of the locations where this fish is persisting, they are pretty abundant. In fact, they're even fishing derbies for Sacramento Perch on some of the lakes. So, you know, I think we're trying to, you know, spread awareness about the fish and a lot of times fish that people want to go catch are fish that people want to protect. So, you know, we're encouraging angling, you look at them as a sport fish. But we're kind of looking at managing this fish on a couple of different fronts. I think there's about 23 waters where we know we've got established populations. So we've been working with UC Davis, and try to look at genetic diversity of those populations. And so you know, the conservation side of things, we're starting to create gene flow between these isolated populations to try to improve their genetics. And we're also looking at trying to establish some broodstock ponds in close proximity because one of the challenges in trying to expand the range of this fish is just getting your hands on fish in the first place.

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It'd be cool if you could decentralize the whole brood pond sort of thing. Just have everyone have their own little ones producing you know, maybe a couple 1000 larvae or something and have, you know, a tech run around the state just pick up those ones and then redistribute them. So it's not like you got one central hatchery doing the job. You got all these private landowners with their own little tiny kind of hatcheries going on

Closest thing we had today right now is that the conscious castor county venture control agency has a valley is to love Sacramento perch, and he actually breeds them in some fairly small facilities there. And he plants the juvenile Sacramento perch in ponds for mosquito control.

They like the small midge larva.

Yeah, it's weird. They got such a big mouth, why are they eating little mosquito larvae and stuff like that?

Well, actually, it's very interesting, because one of the first studies I did on Sacramento perch back in the early 1970s, was looking at their diets because nobody had done that before. And even though really large fish are feeding mainly on midge larvae, and insect larvae in the water, then once once the perch get up to oh, eight to 10 inches longer so then they switch to feeding on fish. But by and large, even with that large mouth, the small fish are feeding on relatively small prey.

From a conservation strategy kind of point of view. What would be the most important thing? Is it getting rid of nonnative sunfish or what are some of the major things that I guess would be best for these fish over time to kind of bring them back?

Well, you aren't going to get rid of nonnative sunfish. They're everywhere. There's some of the commonest fish in California. They occupy the same habitats that Sacramento perch would have occupied in freshwater they occupy. One of the amazing things to me was that I worked up in Clear Lake in the 1970s, which is the largest natural warm water lake in California. And I taught a course up there, students could use Sacramento perch for their study, we're getting lots of juveniles. It wasn't long after that they disappeared from the lake. Yet, that lake is full of nonnative sunfish. So somehow, for over 100 years, these perch managed to make it in the face of competition and predation and sunfish, but they eventually died out so that's the kind of thing you always have to keep be aware of. Sacramento perch are a species that are always going to require continuous management because they simply cannot I handle the interactions with nonnative fish. It's a real challenge for Max and others in the Department of Fish and Wildlife to really keep these fish going.

You know, really what we're looking for is a secure water source, you know, whether it's spring fed or a well fed, you know, managed situation similar where we can control, you know, the establishment of nonnatives sunfishes. That's sort of some of the most important conservation management actions. Just maintain the populations we have looking at the genetics and see how we can prevent inbreeding depression with those existing populations, and then look for new waters where we could potentially introduce the fish.

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If I were going out to say one of these places where they got them established, like I believe you're talking about Lake Crowley up there in the Owens Valley, and I wanted to try to fish for them. Would I need a boat, can I fish from shore? What would I use? What would you recommend if you're trying to guide someone who wants to get into this fish to actually go out and find them?

If you're going to fish for Sac perch your best to get offshore in a boat. Fish for them just like you would crappie with a jig or something like. That's how I've had the most luck. I'm sure Max has much broader experience than I do, though in fishing for such things.

I would agree with you for the most part. I think it depends on the water. You know, some of these ponds, you could catch them from anywhere on shore. I think depending on the time of year, you could get them right from shore. I remember hearing a story from an old, retired biologist that they went out trying to collect fish from Crowley for research and translocation, I can't remember they saw an old guy on the dock and they told him what they were doing. And he said, Well, you should just stay here and went off on their boats and came back and the guy had stringers full of perch just catching right off the dock there. So I think you know, if you hit the time, right, just like anything, you know, you can get them off a dock, off the bank. But that Crowley, I think, early summer, mid-summer, and that sort of 10 to 15 foot depth is where you'd find them, similar to crappie.

What were the attitudes like of people when this fish was declining? Because it sounds like it was popular. That people would kind of be up in arms and saying, "Hey, let's try to save this fish." But seems like that just didn't happen.

No, it quietly disappeared from the Valley. It just got less and less common. And meanwhile, you had all these other fish that are good substitutes. You had black and white crappie, you had two or three species of leptomis, the sunfishes. You have the bass, largemouth bass and smallmouth bass and other basses. So all the other fish were there. In the same waters, you might find a Sacramento perch that filled the need for a fishery. And the Sacramento perch could not handle the competition.

You got that intergenerational amnesia. I saw this out in Maine, because yeah, you just end up getting fish that you grew up around. And out there. It was like bass had come in, muskies, different species, and people just get attached to those. And after each generation, you just don't have a connection to that fish anymore.

Really about by the turn of the 19th century, the Sacramento perch were uncommon. That's when the commercial fishery ended and so forth. So they just sort of faded away.

And I will say that the state did have some efforts to try to rehabilitate the Sacramento Perce population. In the 40s 50s 60s, the state had a warm water fish hatchery called the Central Valley's Fish Hatchery. And in the 40s, they also had fish rescue teams that would go out when the rivers would flood, primarily the San Joaquin, they go out and rescue fish from the floodwaters as they receded, and primarily they were rescuing bass and Sacramento perch, and either translocate them to other ponds, or they bring them into the hatchery grounds and then transplant them elsewhere. So, you know, as the 30s, there was a recognition that these fish were in decline, and there was a need to do something.

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And there was a hatchery program that was ongoing for a couple of decades. But I think at that time, the reasons for the decline weren't as clear as they are now. And so a lot of the efforts to reestablish the fish were in waters that had these nonnative sunfish already established and so many of the translocations and stocking events eventually failed.

David Starr Jordan, who is a great California ichthyology, really, in the late 19th century and early 20th century, wrote in his books that the Sacramento perch was in decline in the late 1800s. And he attributed their decline to carp. He thought the common carp was so abundant in a state that was eating up all the Sacramento perch eggs, and the Sacramento perch could not chase these big fish away. Now, why the non native centrarchids could survive that is a good question, but at least Jordan was on the right track. He knew it was predation on the eggs and larvae that were probably the major problem for the perch.

You two have clearly done a lot of work around this species. What drew you to it? Was it just kind of....happened upon your plate for work or there's something about the species that really attracts you to it?

I moved to the state from Minnesota in 1969. Got a job in Fresno State and everywhere I was sampling I was getting the same fish I saw in Minnesota were in California. But then they also realized that all these native fish...Sacramento perch is just one example of really interested native fish. I thought, "gee, if an easy thing to study, to publish on, this kind of thing gets you tenure at a university was this whole idea that native fish were unstudied in the state. And if you're ambitious assistant professor, you find something you can study and publish on.

How much you Max?

So I guess my first introduction to segment verge was probably my undergrad where I studied under Dr. Peter Moyle here about 20 years ago. And then, after graduating, I got a job with the department working in the estuary doing monitoring trawling surveys. And so I spent a lot of time in the estuary, in the Delta, and kind of fell in love with the area. But Sacramento perch were gone by then. So I didn't get to work directly with them at that point. But I'm now working for the native fishes program and so thankful that I get to work with Sacramento perch pretty frequently. And yeah, I mean, it's native, and it's a game fish. And it's, you know, it's really our primary native warm water game fish.

That's quite a selling point.

That's pretty cool. That ugly, it's not that a lot of people can get excited about I think so.

And I guess my final question would be, if you were to just say, final take home message, you really want to sell this fish to the public, what would you say kind of to wrap up with one thing you'd want folks to take home about this fish?

I think you know, what makes it unique. Whether it's aquaponics guys or private pond owners or anglers, I think most of them are conservationists at heart. And you know, when you talk about a native

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of warm water and a game fish, there's nothing else that checks those boxes. And so that's just something that everybody gets excited about. Sacramento perch are kind of what we've sometimes referred to as California's heritage sunfish, you know a lot of trout and salmon get a lot of press time, but our one and only Centrarchid tends to get forgotten. And so I just encourage people to learn more about the fish and to go out and see it for themselves. They're a great fit to target angling and worthy of everyone's attention. I think.

In addition, I'm saying if you got a spare pond that you can manage for the Sacramento perch. Look forward to the day when those blue pounds gets established that Max is working on and we can get Sacramento perch established all over the state in ponds. If we do that, then people will become familiar with it and be much more protective of it.

Ok I'll role play for a second: "I'd really like to get some tilapia in my pond."

Well, have you heard of Sacramento perch?

Cool. Well get out there and enjoy all the fish especially California's heritage sunfish, the Sacramento perch. Thanks for listening the Fish of the Week! My name is Katrina Liebich. And my co-host is Guy Eroh. Our production partner for this series is Citizen Racecar. Produced and story edited by Tasha AF Limley. Production management by Gabriela Montequin. Post production by Alex Brower. Fish of the Week! is a production of the US Fish and Wildlife Service, Alaska Regional Office of External Affairs, we honor thank and celebrate the whole community, individual tribes states, our sister agencies, fish enthusiast, scientists and others who have elevated our understanding and love as people and professionals of all the fish.