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, August 28 2023. And we're on a week-by-week tour of fish across the country with guests from all walks of life. I'm Katrina Liebich with US Fish and Wildlife Service in Alaska.

And I'm Guy Eroh and this week, we're talking about the Atlantic aerial acrobatic *Acipenser oxyrhynchus* sturgeon.

And we're super happy to have two guests today. Albert Spells, the former project leader of our Virginia Fish Wildlife Conservation office, and Steve Minkkinen, who's the project leader at our Maryland Fish and Wildlife Conservation Office. So big welcome to both of you.

Hello. Thank you.

Okay, so sturgeon, there are big, cool fish. And I always love to start the episode off like this. Could you help us imagine what it might be like to be in the water and maybe feel and just see one of these fish up close?

No, I'll start this is Albert Spells, formerly of the US Fish and Wildlife Service, and to have an opportunity to be just near sturgeon in the waters. It's just really exciting, particularly when you see those humongous animals swimming by and leaping out of the water. It made an impact on me. And I've talked to others as well. It made an impact on them that they'll never forget. And through those encounters, we've had people who've literally become advocates of the Atlantic Sturgeon, it's just a magnificent animal.

Yeah. How big are they? What do they feel like, I'm sure you've handled one of these.

Oh, they're pretty rough. The skin feels like sandpaper. They can get big. The biggest I've ever seen alive was about eight feet and 200 pounds. I did come across a 10 foot carcass on the James River one time, but the biggest on record's about 14 feet and over 800 pounds caught in Canada, help me guys, back in the 19, late 1950s I believe it was

Can you describe the snout it's a really interesting feature of the sturgeon and just kind of the mouth and the placement. Can you just describe what that snout is like, it's really cool.

Ah the snout. It's full of sensory organs. What's so neat about it are the whiskers that hangs down from the snout just before the mouth, it's on the bottom. These are bottom feeders, and they swim along sucking up debris off the bottom looking for worms and the like. Those sensory organs help them to discover to the food that they're searching for. And it's the same for all sturgeon across the world with the barbles hanging down as a sensory log and the mouth just behind it.

And the mouth can extend that's a long tube it can extend it's like a foot long and the larger fish.

Oh my gosh, completely different from a bony fish.

Yeah.

What can they fit in that mouth? Like how big is it?

I'd say four inches wide. They eat, you know, worms and mollusks and things that are in the substrate

Yeah, in the Atlantic, for sure. The mouth is almost like a proboscis. They swim along and they stick that mouth out and just "slurp" like e a big old vacuum cleaner, sucking up everything. It's like looking for worms. And that's awesome.

It's a cartilaginous fish. You know, it dates back to the time of the dinosaurs. You know, it's just really fascinating. rough skin and bony plates. And, you know, they can touch their tail to their nose because they don't have vertebrae to restrict their movement. It does make it difficult to handle them at times, because they're so strong and flexible. They're basically all muscle.

I think we will be doing this species a disservice if we don't mention the leaping behavior that's associated with I think I remember reading a study with was on the Gulf subspecies of Atlantic sturgeon, I guess you'd call it the Gulf sturgeon. But they found like in a one kilometer stretch, they're recording like 1000 leaps a day. So what is this behavior? How far out of the water these fish getting? And why do they do it?

I've seen it happen. I mean, they completely clear the water. And it's pretty impressive when you see a fish that weighs several 100 pounds, jump completely out of the water. And there's stories about colonial times where people actually getting killed or their legs broken from sturgeon jumping out and landing on him and their boats. So it's a common activity they do. We have no idea why they do it, whether they're trying to get parasites off them or they're just trying to show other sturgeon that they're there. We don't know what their behavior is. But I've seen it myself on the Marshy Hill River when we're out there gill netting for sturgeon in the fall. It's amazing to see.

It's a cool way for people to interact with the fish, actually see it.

It is, yes!

There's a story there. The James River Association, which is a regional non profit. Their mission is conservation of the James River. They start at sturgeon tours. And in the fall of the year, you can pay to get on their boat and they will take you out and you can watch leaping sturgeon. I've been on a couple of those trips is really neat. And the story about them killing people. I don't know if they killed anybody. But that's a story about you know, folks going up the river, the Gulf Sturgeon has severely injured people within the last decade or so. So it can still happen. You just imagine. You tooling up the river at 25, 30 miles an hour and 150 pound object jumps out of the water and you smash into it and do some damage.

Yes scary. Oh, yeah.

It's neat with these with the East Coast rivers. I mean, they had a big array of migratory fish. And that's something that's neat about this fish is they do migrate. Can we just talk a little bit about maybe a year in the life of these fish or just what their life cycle is like?

Well, Atlantic sturgeon are anadromous, which means they live a large portion of their lives in the ocean, and they come back into freshwater to spawn. And one of the things that we found about Atlantic sturgeon is they typically returned, we believe, to the rivers that they were spawned and they'll come in, in the Chesapeake, particularly the James River, they'll come in the spring, and in the fall to spawn, they love flowing water with hard clean bottom. They lay those eggs over the bottom. After they hatch they'll seek out the interstices of the substrate as refuge as they migrate down river, and they may stay in a river for two to three years before the migrate to the ocean. So we can find juveniles year round here in the Chesapeake. And then they go out into the ocean. One of the things that we found about Atlantic sturgeon is they have a tendency to migrate up and down the coast. And they will stick their noses in rivers that they don't necessarily belong to. Going on feeling forays, and like they may not be spawning there. But just because you catch a sturgeon in a river doesn't mean that sturgeon spawned there. These females they only spawn once every three years or so. When you only spawning once every three years. I mean, really, that's a fecundity of about 300,000 eggs a year.

And how old are they before they can start spawning?

The females are probably, you know, 12, 15, 20 years old before they start to spawn. The males a little bit sooner. But deforestation and agriculture probably have major impacts on sturgeon by releasing a lot of fine sediment into that spawning habitat, you know, which is typically just below the fall lines. And you know, could really, I mean, if they don't have that hard spawning habitat, substrate, that really compromises their ability to reproduce.

Yeah. And one of the things that we've learned is that they have a bimodal spawning period here in the Chesapeake. They have a spring spawning race, as well as a fall spawning race here. We found that to be the case in the James. We don't see many spring spawns anymore. And we think that's because the waterman out there fishing historically in the spring of the year.

We have a population on the Nanticoke and Marshy Hope River in Maryland that is a fall spawning population that we just discovered back in 2014.

It is so interesting. When John Smith came he always talked about sturgeon. They were so numerous. And and he talked about how the sturgeon came into the Chesapeake Bay and the larger ones came in the fall. I mean that evidence was in front of us for the longest but it took Dr. Matt Balazik who's now with the Corps of Engineers formerly with Virginia Commonwealth University, with his work on the James River to finally figure that out. I argued with him for some time about that. I just bow to him now.

The northern populations are spring spawners, and we seem to be on the line here where Chesapeake Bay we have spring and fall spawning populations. And further south, you know, southern researchers

have talked about fall spawning for a long time and a lot of people weren't sure if they could believe that or not, because, you know, anadromous fish generally spawn in the springtime. But through time, we have found that you know, we have fall spawning populations of Atlantic sturgeon.

Which is not unusual for the genera, because there are several species across the world that demonstrates this bimodal spawning. So it's been out there. We just never picked it up in the Chesapeake until in recent years.

That's cool.

So I'm curious if you could talk a little bit about you know, Native American people used to use it they found 1000s of scutes and archeological digs around the Jamestown for it. So was this fish used historically and then what led over the centuries to it eventually become an endangered in 2012?

Historically, there's stories about the Atlantic sturgeon here in the Chesapeake. This story don't know how true it is. It's legend. That if they can get in the river and ride a sturgeon, they become a man. There's also stories about how watermen on the James River would catch these big fish. And at the time in Richmond, there was a wooden bridge there that horses would cross. But when these waterman captured the sturgeon, and there was no refrigeration, so they want to keep them fresh as long as they can so they'd tie them at the base the bridge, these fish are so large, there's so many of them, and they're pulling trying to free themselves, the bridge would vibrate.

Oh, man.

The bridge would move so the horses wouldn't cross the bridge. So it started fights between commercial people on land and the waterman and Jamestown. This is Albert's theory here, probably without sturgeon we wouldn't speak speaking English here today. There were sturgeon scutes found and in Jamestown, to a large extent. Another thing too, I believe if there were official American it should be sturgeon, and the cod people probably fuss at me as much as the shad people. But in Jamestown during the starving times about 1610 I think it was more than half the colonists died. They were under siege by the Native Americans. So they couldn't get out they couldn't get on land hunt. But then if Americans had taught them how to catch sturgeon. So there's evidence from the pits at Jamestown, that they survived largely on Atlantic sturgeon during that time. So half of them die. Now we're getting ready to abandon their fort, which was English fort. And where the English were Spanish were always pretty near. They went south and in Florida. So I guess theoretically, if these colonists would have left that area, this area would have been taken over by the Spanish so we've made the speaking Spanish. That's Albert's story, I'm sticking to it.

Europeans came over in the 1800s. And some of them had experienced sturgeon fishing over in Europe, where they harvested sturgeons, for meat and for caviar, and they created a fishery and a lot of those fisher moved on up the coast fishing populations and depleting populations. And then they move on to the next river system, and fish for them. And a lot of that fish was used in the US but also exported back to Europe.

And Virginia, the sturgeon meat was called Shaw City bacon I think it was. Those initial shipments back to England from the James River, which at that time is probably the most populated area in North America with the English. Once they reach England, it was spoiled. They didn't process it, put enough salt. It wasn't very good. So they didn't make much of it. So the sturgeon was in the river. Then along came the Industrial Revolution, where we started dumping pollutants in the water. People were catching sturgeon and other diadromous species using them as fertilizer dams were built. Even though I think, in Virginia dams did not have much of an impact on on spawning populations, because it doesn't appear that the fish went much farther than the fall line to spawn. Even though they did go farther up river, but most of the spawning was below the fall line here in in Virginia.

Below the dams.

Below the dams. In fact, in Virginia, even back in the 1700s that was policy to put in place on dam owners to put fishways. They weren't very effective, but they it was a law. And there was a law forbidding the capture particularly of striped bass of a certain size because people were catching them, dumping them in holes for fertilize. So so we had a lot of habitat degradation during that industrial revolution. Just look at the pictures of a civil war. You see trees? There was no trees. Trees were used to build cities. Much the areas were denuded. And I think agriculture with tobacco was a crop that didn't hold salt on the land very much that I think one of the big problems with Atlantic sturgeon now is good spawning habitat. We were told what would happen with global climate change with the periodicity of of precipitation, how you're going to have very, very severe rains. We start to see that now in the spring of the year. And when that happens, sediment gets into the river. We started this conversation by me saying that the sturgeon required hard bottom to spawn on. So that's lacking, probably back in 2016, 17, we did some mapping of the bottoms and you could find a lot of hard bottom signatures. But when you did the ground truthing just atop that hard bottom was fine material, sand. That's all it took to make it unusable for sturgeon. So Right. So one of the things we see with these freshets coming down the river, I mean, one day, you may have a gravel bar there this clean, do you get a rain next day is covered up.

With modern fisheries science, you know, the populations that already been decimated by the fisheries in the late 1800s or the early 1900s. So there wasn't a lot of fish to study for a lot of these populations. There is sturgeon populations in all the major river systems along the east coast of the United States. And you know, the those populations to various levels got fished down to extinction or to very low levels. And that certainly happened to the Chesapeake.

They were fishermen, waterman as we call them in the Chesapeake, were out typically fishing for anadromous fish, American shad and striped bass, and they typically will get bycatch of sturgeon. I heard one old Waterman said, if they caught a 200 pound sturgeon man that pay the bills for several months, back in the 40s and 50s. At some point, it just was not feasible to commercially, target sturgeon cause they just weren't there anymore. And we believe a lot of that's because the fishing pressure and habitat loss. Yeah, that's a neat thing in the Chesapeake too, is one reason I got involved in sturgeon. And I can actually remember being a young biologist sitting in a room with some older, more experienced biologists with the Fish and Wildlife Service and back then Virginia Department of Game and Inland Fisheries talking about striped bass. This back in the 80s, Steve. Nobody's doing

anything with sturgeon, you never hear anything about those. Later on, there were some folks who would work with sturgeon a lot more than me, they had actually come to the close into sturgeon and the Chesapeake were functionally extirpated. However, I was fortunate enough that in the early 80s, my office was located at the Virginia Institute of Marine Science.

VIMS.

At VIMS. Yep. They had a liaison, Steve Owens. Steve Owens told me, Albert...his job was the liaison between the university and commercial watermen. They're catching sturgeon, but not gonna say anything to you unless the money is put on the table. So that's how they got involved because there really had not been a sturgeon study in the Chesapeake Bay in forever. Nobody studied them because nobody thought any was around. So you know, people were coming to conclusions and nobody was actually looking for the fish. And actually, Steve over in Maryland, remember the fish that you guys released? You had tagged like, I guess you'd gotten them from Lamar.

We got fish from Lamar fish hatchery. In 1996, we released 3000 fish into the Nanticoke River. And we had like a 14% recapture rate on those fish. So they resided in the bay for several years, and then they became part of the migratory population.

I think one of the things that came out of that Steve that was one of those watershed moments is when you started that reward program. Steve actually originated that idea, of the reward program. Him working with the Maryland Department of Natural Resources, I believe, Steve?

I worked for the Maryland Department of Natural Resources for 20 years before coming to the service. So I've been working with a service for 20 years now.

Yeah, he started that reward program and we just jumped on board to try to support his program to determine what the distribution of those hatchery release fish might be in the Chesapeake Bay. We started the program in support of him in Virginia and lo and behold, we started catching a lot of fish.

That's cool.

Actually got a couple of tagged ones, but most of them over 90% of fishes we caught were wild fish.

And in 1996, the Atlantic States Marine Fish Commission established a coast wide moratorium for all sturgeon species. And that is the year actually we did our release into the Nanticoke River. We started the Chesapeake Bay reward program. We assume that we just catch hatchery releases but it turned out over the course of the program from 1996 to 2012, several thousand Atlantic sturgeon and hundreds of Shortnose sturgeon, the wild fish that were also present in the bay that we'd never knew about before. So the tagging program provided some real interesting data that we did not have any access to before.

Can you tell us a little bit more about what the reward program is?

Reward Program was soley for a commercial fisherman. I mean, there was only ever a couple of anglers that caught sturgeon because of the way they feed their tube like mouth. They feed in the bottom, not targeted very much by hook and line fishing. But those commercial fishermen that would encounter sturgeon. We did that release in '96. We offered a $50 reward of waterman letting us know they have a sturgeon. We were tagging fish. We'd go and look at all the fish that they caught. And we ended up collecting all kinds of data that we had no knowledge of before, we didn't know they were encountering all the sturgeon. We didn't know there was still Shortnose sturgeon in the Chesapeake.

You mentioned the Shortnose. sturgeon. How would someone, one of these Waterman if they caught a fish, know that was an Atlantic sturgeon versus a Shortnose sturgeon?

They would tell us when they called a lot of times that "I have one of the smooth ones." Because shortnose sturgeon only get about three feet long. But when you touch them, they're not nearly as sandpaper like as Atlantic sturgeon. They really do feel a lot smoother.

I heard one waterman referred to them as snake sturgeon.

Oh!

Huh.

And one way that you might tell the different, sort of hard when during the juvenile phase. But as they get older the snout of the Shortnose was more rounder than the Atlantic. The Atlantic gets much bigger.

When you have a fisherman that maybe called in, they say "we've got, you know, the soft sturgeon" or you know, "we've got a sturgeon." What kind of information would you collect from them? And what would you do with that information?

We'd send a biologist out there, we'd collect information on length, we have a variety of tags we were putting in and over the years as technology advanced, we were putting better tags in there: sonic tags that we can detect for, you know, up to a decade after inserting them into the fish.

And you're trying to understand kind of their movements and like, what are those tags doing exactly?

A lot of the tags we use to track the fish where they're migrating to. And you know piggyback on other researchers work where they have acoustic arrays deployed. They also would encounter our tags and provide data to us about where these fish go after they've been tagged.

One of the neat things that came out of this project, first of all, I think it helped us in Virginia, their relationships with watermen. This is back in 1997. You know cell phones weren't that widespread. We had them I probably name use it, but we had pagers, we give a pager number, they caught fish, they would page just and we had an agreement with them. You put your fish in a container and lots of times it was small fish that would just take the guts out of a crab pot and leave them there. Tell us where they are, we'd come get our information, we would get length, weights. Back then and we started Steve we

only had spaghetti tag and the PIT tag. We didn't have the acoustic tags at that time. We would get that information in Virginia. And I watermen did real well and we were offering $100 per fish if it was alive. We'd give you $100. And people would call us. There was a couple guys on the staff at Harrison Lake National Fish Hatchery, which I supervised at that time as well. And myself, we would be busy seven days a week. And we got a lot more fish than any of us. I didn't have a budget for it. It was just on fire. We go get a few fish and we start catching fish and approached Maryland DNR, Chesapeake Bay Foundation, Virginia Marine Resources Commission, and everybody put some money on the table. And we did that program for over a year initially, and got over 300 fish and over 90% of them were wild fish. And that informed us that hey, you might want to look closer at this. So I think was a real important program. Real important.

We ran our Chesapeake reward program from '96 until 2012. 2012 was the year that sturgeon gotten listed as an endangered species. And we had to discontinue that program because commercial fishermen then weren't allowed to possess fish in any form live or dead.

Yeah. So this is a long lived fish and they have a long life cycle. They mature late, what are some of the things that you guys are doing to kind of hopefully bring them back to recovery at some point.

We didn't think Maryland had any more populations of Atlantic sturgeon. In 2013 a sturgeon jumped into a boat in the Marshy Hill Creek and the anglers took a picture of it and sent it's a DNR and we talked to them. In 2014 we started doing some gill netting in the Marshy Hill and tagged several very large adult Atlantic sturgeon. So that's how we find out that we had a population still in one of Maryland's rivers.

One of the big things, the hurdles that these fish have to overcome, iss bycatch in other commercial fisheries. So back in the early 2000s, we were working with scientists from VIMS, looking at gear configuration, and try to reduce that bycatch, particularly in the spring of the year. One configuration we found that worked in the spring, find out it doesn't work as much in the fall of the year, is a gill net has an anchor line and the float line on it. An anchor line is weighted and it rests along the bottom and it creates that curtain that we've all heard about with gill nets. Well, one of the things Chris Hagar found was if you could get the bottom of the net off of the bottom...

Let those fish swim under.

Yep create a window so the fish could swim under that we could reduce bycatch during that period. I don't know that fishermen are using it. But we know it works. It can get really complicated. One thing about requiring gear changes is you know, watermen, just like the rest of us they work on a budget and to buy new gill nets can be very expensive. But we did discover with this small data set that we have is that we could reduce the catch of sturgeon while maintaining the catch of striped bass in the James.

That's great.

So yeah, it can work. I don't know that it's being used. But we know that can work in the spring of the year. Another things with the acoustic tags that we found about movements along the Atlantic coast that was oh gosh, what's the fishery? Steve? Where the waterman we're leaving the nets...

Monkfish.

Monkfish fishermen. They were killing a lot of surgeons. A lot of surgeon, but those regulations were changed. Because they were just leaving that out there for days on end. For days on end. We know the gut surgeon release it within 24 hours and cooler water, I don't think it works much and in the summer, but that fish can survive. But this monkfish fishery was killing a lot of sturgeons. And so the regulations were modified. So they have to either monitor the net or leave them for a shorter period Steve, is that correct?

Yes. They have a shorter timesets now. Yeah, so the fish those nets like once a week? Yeah. And they were using a mesh size that was a bad size for sturgeon, because it would tend to hold their gill flap shut and then they couldn't breathe. Yeah, so they suffocated in the nets.

So just to kind of summarize, it sounds like I mean, reducing bycatch is one way to help these fish and land use issues with sedimentation. So there's I'm guessing some best practices for landowners up and down their range. You've mentioned migration barriers. And then you've also mentioned hatcheries Is their techniques are those kind of the main pieces of this puzzle in terms of helping these fish?

I think an important component there is also collecting information out of our office. We've run a coast wide tagging program for sturgeon as well, since 1988. It's still going on today. And you know, after the the Endangered Species status, we were limited in being able to collect data. But now with this Coastwide tagging program, we're using other researchers that can provide us with information. And you know, since then, over 34,000 Atlantic sturgeon have been counted in this tagging program, and over about 16,000 Shortnose sturgeon in the program over the years. So we're trying to use other researchers' captures of these fish to provide us with some some fisheries data for them, because when you have moratoriums, and they're declared endangered, you know, no one's going to tell you that they're catching these fish. So you need to find ways to collect scientific information on the populations.

That tagging programs is huge. One thing that came out of this, I just like to point out, for example, when there was research and looking at windmills off of the coast of Virginia, the Department of Navy, who was one of our partners working with NMFS primarily, they pay to have receivers put out in the line through windmill sites 80 miles offshore. We've never thought about surge and move going 80 miles offshore, but we found Chesapeake Bay sturgeon out there. And they range from Maine to Florida. So they cover a lot of territory.

Yeah, a lot of pooled resources to kind of capture that. I mean, yeah, that movement.

We'd have never learned that if we didn't create those partnerships.

Speaking of the straying stuff, Are you guys familiar with that Baltic reintroduction program. Apparently very recently, like 1200 years ago, they found there's a population of Atlantic surgeons that moved from Canada, all the way over to the Baltic Sea like Poland, Lithuania, Estonia. It actually is like fewer than 10 fish the geneticists say, but they started a self sustaining population that lasted for like 1200 years until the 60s, and now they're trying to bring fish from Canada back over there to reintroduce Atlantic sturgeon to the Baltics. Yeah.

Yeah.

I'm curious if you could just give us a quick description of you know, what a Fish and Wildlife Conservation Office does? Both the Virginia one and the Maryland one, what's kind of the scope of your work and how do these fish fit into that?

My office we work with a lot of anadromous species - striped bass, American shad sturgeon, American eels. We work a lot with the Atlantic States Marine Fish Commission on their technical committees. We do a lot of in the field research. We extensively work with Northern snakeheads, you know, to monitor this invasive species that's been introduced to the bay. You know, now we have another one blue catfish that's becoming really abundant here, we're very concerned with, so we do a variety of work both with management agencies, and directly out sampling fish to collect information on populations of the different species that occur here in the Chesapeake Bay.

Okay.

Well, three years ago, we were heavily involved in habitat restoration. With road crossing remediation and dam removal when I left office. We had worked with partners. Partnerships are so so important with us because we can't do anything alone. We don't have all the expertise of the bodies to get the work done. So we depend on non government organizations and states and other federal agencies. And by the time I retired, we had worked with partners to reopen over 1100 miles of passage for anadromous fish and native species.

And after sturgeon were declared endangered, in order to do any research with sturgeon you needed to have a research permit through NOAA. So Albert was the first in charge of the Chesapeake Bay research permit for sturgeon to coordinate with all the researchers that were working in the Chesapeake Bay. And after Albert retired, I took over running that Chesapeake Bay research permit.

The configuration of that permit was, I think, important. And that's why we did it like we did to get the partners to all come together on one permit. That way when that data was gathered at the end of the year, you have one central reporting location. This is a NMFS permit, they administratively responsible for sturgeon on the Endangered Species Act. So that data would go to NMFS, and everybody could share in that information. Information sharing is so important, the move our knowledge forward. Because one of the things I found is that the more we learned about this animal, the less knew. It seemed like every year, there was something new and that's what made it exciting. Make a whole career out of this.

That's cool.

Yeah, I really agree that the information that different researchers are putting together in one place is really valuable to give us a better picture of what's going on with sturgeon in the Chesapeake Bay.

Why should people care about the Atlantic sturgeon?

We're talking about a living dinosaur here. We certainly don't want to see something that's, you know, a dinosaur go extinct on our watch, you know, so if we can somehow collect enough data and figure out ways to protect them the best we can, you know, so that we have them for future generations.

And the fish has been so important to America, from its founding to the present. Without sturgeon, the original colonists for Jamestown may not have survived. Commercially it's been important. And in fact, today is used as a standard for developing the dissolved oxygen standard for the Chesapeake Bay. It's very important fish.

That's cool. Okay, well, thank you two, for joining us really appreciate you.

Thank you!

Get out there and enjoy all the fish especially America's fish the Atlantic sturgeon. 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