

## Alligator Gar—Gargantuan Fish! – S2E16

**Dr. Sandra Rideout-Hanzak** [00:00:08] Alright. Well, I'm here with Dan Daugherty of the Texas Parks and Wildlife Department. Dan is a Research Biologist with TPWD. And he is going to talk to us today about what he does. So why don't you tell us what you do, Dan?

**Dan Daugherty** [00:00:22] Nice to be here. I'm like you say, I'm a fisheries research biologist for the Inland Fisheries Division of the Texas Parks and Wildlife Department. And mainly our primary role within the division is to design and conduct fisheries research. That is, that that allows us to provide the information to better manage fisheries in Texas.

**Dr. Sandra Rideout-Hanzak** [00:00:52] Okay, great. That's interesting. And fisheries in Texas for folks who don't know, I mean, what all does that entail? What are we talking about with fisheries in Texas?

**Dan Daugherty** [00:01:03] Well, it could really be it could really be anything from, you know, the probably the most well-known fisheries in Texas, like largemouth bass fisheries. But it could be things that people don't necessarily also fish for, like various minnows, native, non-game species of fish in any kind of system, essentially rivers, reservoirs, small streams, you know, pretty much anywhere across the state.

**Dr. Sandra Rideout-Hanzak** [00:01:35] Okay. So you're not just working like with game fish, you're working on maybe like the whole ecosystem or all the fish in the ecosystem. Is that right?

**Dan Daugherty** [00:01:44] Yeah. Yeah. Some of our work is species specific, obviously and usually when it's either a conservation related issue given, you know, some rare threatened or state endangered species of greatest conservation need type species. But we also do work on the community level. So, you know, figuring out community dynamics in fish assemblages and how they respond to various abiotic factors as well.

**Dr. Sandra Rideout-Hanzak** [00:02:17] Okay. Sounds good. Well, one of the things I think that you work on is alligator gar. I think you've done a bit of work with them. And that's what we want to talk to you about today. Can we just start with: What is an alligator Gar?

**Dan Daugherty** [00:02:31] Yeah. So we've been working on alligator gar for about a little over a decade now in Texas, particularly our office here at Heart of the Hills Fisheries Science Center. An alligator gar is the largest of the gar species. So you have in Texas, you can find short nosed gar; you can find longnose gar, spotted gar and alligator gar, and alligator gar are by far the largest. They are the largest freshwater fish in the state. They're also our oldest freshwater fish in the state as well. We have documented age of alligator gar in Texas to 64 years.

**Dr. Sandra Rideout-Hanzak** [00:03:12] Wow, that's cool. I might have guessed that they were the biggest, but I don't know that. I never heard that. Definitely didn't know they were the oldest.

**Dan Daugherty** [00:03:22] Yeah, they're the largest of all gar species. Like I said, you can find four different species in Texas. There are seven species across North and Central America, but four of them you can find right here in Texas.

**Dr. Sandra Rideout-Hanzak** [00:03:39] Okay. Neat. And when you say they're the oldest you're talking about, they live the longest. But I think...

**Dan Daugherty** [00:03:46] Well, yes and no. Well, yes and yes. I'm talking about they live the longest. But I'm also, you can also think about it as in terms of them being an ancient fish or a primitive fish, they've been around in the fossil record up to probably about 200 million years. The fossils that have been found for alligator gar in the Permian Basin, they look exactly, the fossil looks exactly like modern day gar. So they've retained the vast majority of their primitive characteristics to today.

**Dr. Sandra Rideout-Hanzak** [00:04:23] That's really neat. I mean, that raises all sorts of questions, like why wouldn't something change? Did it not need to change, or what? I mean, any idea?

**Dan Daugherty** [00:04:35] You know, I think they're a pretty resilient species and so, you know, they haven't they haven't really had to adapt to much, much change or having, you know, the selective pressure just haven't been there for them to change much.

**Dr. Sandra Rideout-Hanzak** [00:04:49] Okay, that's really interesting. So where can we find them? You said they're freshwater fish. Can you be more specific or tell us, like, where we might find them?

**Dan Daugherty** [00:05:01] Yeah, sure. You know, they're classified as a freshwater fish, but they're "euryhaline" or able to tolerate a wide range of salinities. You know, in freshwater, you have very low, low salinities. Obviously, as you transition to the coast, you start getting into the brackish water where the salinities are higher out into the bay systems higher yet and then out into full strength. Seawater, which is roughly 35 parts per thousand I believe is classified as full seawater. But you can actually find alligator gar in freshwater and all the way out to full strength seawater. Wow. Highest recorded salinity at a site that an alligator gar has been found has been 52 parts, parts per thousand, which is like very salty. They're more aware the higher the salinity. But, but like in our base systems there are tons of alligator gar. I was just going to add if you want to like visualize where they are in the state, if you kind of draw a line from like Lake Texoma through Dallas to Austin over to Del Rio, everything east of that essentially is kind of the alligator gar range in the state.

**Dr. Sandra Rideout-Hanzak** [00:06:15] Okay, that's interesting. And do they like slow waters like lake water or do you find them in fast moving water or what?

**Dan Daugherty** [00:06:24] Yeah, they're, you know, given that they grow so big, I mean, the biggest ones that we actually handle here in Texas are over eight feet. They're not a fast water species. They typically like slow moving, like pool habitats and rivers. And then also, like, you find them in a lot of reservoirs and, like I've gone out into the bay systems where you don't have any flow really to speak of, so you don't typically find them in the fast moving riffle and run habitats of rivers or things like that.

**Dr. Sandra Rideout-Hanzak** [00:07:04] Okay. And what do they eat?

**Dan Daugherty** [00:07:06] Well, they're what is classified as an opportunistic feeder. So they're not specifically targeting any particular prey item per se. They pretty much feed based on what's available. So a lot of the times, you know, that's more the quote unquote rough fishes, for lack of a better term. Also like, you know, gizzard, shad, buffalo carps, so on and so forth, they're typically more the constitute more of the biomass in systems than,

you know, like game fishes do. So they tend to feed mainly on things like shad, carp, buffalo, so on and so forth in the bay systems they feed also primarily on shad, mullet and some and crab as well.

**Dr. Sandra Rideout-Hanzak** [00:08:03] So they're strictly predators. They're not eating anything like seagrasses or plant life or anything like that. Okay. Very cool.

**Andrew Lowery** [00:08:12] So if I heard you correctly, they eat almost only largemouth bass, right?

**Dan Daugherty** [00:08:21] No, you did not hear me correctly.

**Andrew Lowery** [00:08:23] Okay. I just wanted to make sure.

**Dan Daugherty** [00:08:25] You know, that was one of the great misconceptions about alligator gar before anybody started working on them was that they tended to eat sport fish primarily, namely largemouth bass, crappie, white bass, things like that. And so they had this bad reputation of being a competitor, essentially, of the fisherman. So while they will eat largemouth bass here and there or crappie here and there, again, it's opportunistic. So, you know, if they happen to be in the one spot and the bass happens to swim by and they can grab it, they'll grab it, but they're not actually targeting them, which was like the common misconception back in the day. And that's and that's why, you know, prior to probably the 1990s, 2000 alligator gar, they were not managed. There were no limits. You could take as many as you wanted. There were actually efforts by our predecessor agency, which was the Texas Game and Oyster Commission. I can't remember exactly what the name of it was, but they were there were efforts to actually go out and eradicate gars, not just alligator gars, but gars in general from systems because of that thought, that they were they were highly, a large competitor for game fish.

**Dr. Sandra Rideout-Hanzak** [00:09:52] did not know that.

**Andrew Lowery** [00:09:53] That was actually our exact next question. I was gonna ask you about their conservation history here in Texas but you answered that beautifully.

**Dan Daugherty** [00:09:59] Yeah. So there really was no conservation history until, you know, the 2000. We started working on them here and about 2007, and that was fueled by kind of a kind of a paradigm shift, um, prior to, you know, in their 1970s, eighties, nineties, I'll say. And in that range, you know, a lot of folks were focused on, on the, the classic game fish is largemouth bass, white bass, crappie, so on and so forth. As fisheries developed and people started to pursue other things, they, you know, the whole molt the idea of a multispecies angler where you've kind of got this bucket list of things you want to catch. Kind of changed from a classic traditional fisheries type to people started to pursue all these other species and all these other places. And we started to see an uptick in people coming to Texas to fish for alligator gar. Not just Texas anglers, but people coming from all over the world here to fish because we had great populations still, despite our best efforts at not, you know, managing our fisheries for a long time for alligator gar, we certainly saw this increase in interest and angling activity around alligator gar. And so we wanted to make sure that we responded to that and collected the data we needed to make sure that we could manage alligator our fisheries here in Texas responsibly and sustainably. And that's where our work started. The first regulation on alligator gar started in 2009 when we went from unlimited fishery to one fish per day per. And then in 2019, I believe there was a special regulation added on for the Trinity River, which is now a draw

fishery for a set number of tags per year for fish over 48 inches. That's was put in place essentially to protect the trophy quality of the fishery. There's also a mandatory harvest reporting for fish across the state with a couple exceptions, where if you catch and keep an alligator gar, you're supposed to report it.

**Dr. Sandra Rideout-Hanzak** [00:12:28] Hmm. So that's interesting. How popular are they now? Could you, like, rank them among the other game fishes or something like that? Do you have any idea?

**Dan Daugherty** [00:12:40] You know, relative to largemouth bass, there's still not that, you know, that bass will probably always rank as our number one fishery. But I would say that they're probably in the top five most sought after species, especially in freshwater would be bass, crappie, catfish. Striped bass, probably white bass. They kind of come together, then probably alligator gar somewhere. Somewhere around that number five mark on the coast. People fish for them on the coast as well. But I don't know where they would rank out there. We have, our department has a coastal fisheries division. So while I do some work on alligator gar there, we hope that they're their own separate entity, so.

**Dr. Sandra Rideout-Hanzak** [00:13:29] Okay, well, where would fishermen find the best trophies if they're looking for a trophy Alligator gar?

**Dan Daugherty** [00:13:37] Well, like I said, the Trinity River is world renowned for the trophy potential of alligator gar. There is a number of, a lot of guide services taking clients from all over the world. And I know people that come from Europe and Asia and, you know, just pretty much from everywhere to come and fish the Trinity River to catch a alligator gar, particularly a trophy size alligator. And when I say trophy size or quality size, we're talking a fish six foot and up. There's plenty of fish in that system over seven feet and a decent chance at catching an eight-foot-plus fish.

**Dr. Sandra Rideout-Hanzak** [00:14:20] Now, what makes a trophy? Is it just size alone or is there anything else?

**Dan Daugherty** [00:14:28] I think, trophy is in the eye of the beholder.

**Dr. Sandra Rideout-Hanzak** [00:14:30] Oh, ok.

**Dan Daugherty** [00:14:31] Really. But, you know, we as fisheries researchers and biologists, we kind of set this whole kind of classification system you use where you have these different classes of fish and they're set based on links. And so usually you set, you know, like a trophy class or a quality size fish up there in the upper echelons of the length distribution that they can achieve. And so that's for alligator gar. We usually use the six foot mark as being the quality size or trophy size class.

**Dr. Sandra Rideout-Hanzak** [00:15:13] Okay. For folks who've never seen one in person. Well, I think I've only seen them at aquariums. But what color are they? Do they come in, like, a range of different appearances or anything?

**Dan Daugherty** [00:15:26] Yes and no. The typical alligator gar looks very much like an alligator from the head. It's got this duckbill, you know, a large, flat snout full of teeth. Usually an olive color with some with some black mottling spotting in them, particularly, you know, near the fins. On the fins. But there are color variants. I've seen fish that are very light, almost a yellowish appearance, and then also fish that have been jet black as

well. So this is you know, this is just individual variation in their expression of various colors. You know, you get melanistic, kind of the black, and the leucistic is kind of the yellow. And then the normal individual has that all of the green color in between. So that that the obviously those ends of the spectrum the black in the in the yellowish color are pretty rare. I've seen about, I would say, somewhere in the neighborhood of 1% or less of fish that are not normally collared, but they do exist. And you actually can see quite a few spotted gar which are another species of before I mentioned that are in Texas. There's quite a few of those that you can see come up to the surface and will be almost jet black if not jet black. But it's less common in alligator gar.

**Andrew Lowery** [00:17:11] So a lot of wildlife enthusiasts would love to have a career with Texas Parks and Wildlife Department. You know, what advice would you give to people who are trying to get that first entry-level job with Texas Parks and Wildlife Department? You know, do you have anything specific that you could give them to help them get over the edge a little bit?

**Dan Daugherty** [00:17:27] Yeah. Well, you know, the standard answer is, is volunteer, volunteer, volunteer. And there's a there's a good reason why that's a standard answer. And that's because people can associate a face with a name when, like you said, there's a lot of people that would like to get a job working with the state or federal government in a wildlife-related field. So when a job does come open, they're highly competitive. And so, you know, you've got someone sitting at a table that's got a stack of applications a mile long or a foot deep. You know, they see names. But if you can put a name with a face then it makes a difference. And that's why they say, people say volunteer wherever and whenever you can. But on top of that, one thing that I've noticed is, going on my 17th year in this job, one thing that I've noticed over time is people have gotten away from a very complete and comprehensive application packet, and I think that has a lot to do with the fact that we've moved to a very electronic system of communication in today's world. You know, when I very first started, it was going to date me, but my application was printed and sent. It wasn't sent in an automated system online. You know, when you apply for a job online, which is the requirement now, people tend to forget about things like cover letters, you know, your transcripts unless they're asked for, so on and so forth. And one of the things I've seen the least of more recently, and this is the trend I'm noticing continue to get worse, is people not writing a good cover letter. And again, you know, when you've got a stack of applications and you've got to go through and whittle down that that stack, it's nice to have a cover letter that's addressed to the job. And it gives them, it gives us a summary essentially of everything in all the other pages. And that will get us to a point where we will want to look at the rest. So I would strongly encourage people to try to do a good cover letter that's addressed to the job that you're applying for, not just a blanket cover letter for, you know, what a bunch of jobs you're applying for.

**Dr. Sandra Rideout-Hanzak** [00:20:06] That's really interesting to hear, because for years I taught here an Introduction to Wildlife Professions, and we always had people do a resume, and make a list of references, and write a cover letter. And they had to download a job that was being advertised right now, you know, currently right from three or four different websites and, Texas Parks and Wildlife might be one of them. And then write a letter for that job. And that is the hardest thing for people to do. So it really takes some practice.

**Dan Daugherty** [00:20:38] Yeah. it does. It's definitely a skill that you need to work at in order to learn how to. It's essentially a sales pitch. The way I look at it, I've always kind of thought about it as, the cover letter, as a sales pitch about why you should hire you.

**Dr. Sandra Rideout-Hanzak** [00:20:56] Well, you know, I always told them that the resumé is sort of, why you should interview me. And I really like how you said that the cover letter is, why we should go on with the rest of the packet. Why should we look at your resume and your application? You know, we need to see that in the cover letter. So that's interesting. But such an important part. And, I think you're right. People, maybe they aren't very comfortable with it, so they just want to skip it now. Good to know. That's really good advice I think. Don't you think, Andrew?

**Andrew Lowery** [00:21:37] I think that's wonderful advice.

**Dr. Sandra Rideout-Hanzak** [00:21:38] I want to ask you what your favorite fun fact is about alligator gar. Do you have a favorite little, like, little-known fun fact?

**Dan Daugherty** [00:21:48] Yeah. Yeah. Well, where do I start? Very interesting things about alligator gar. After having worked with them for over a decade now, I pick up a lot of little things. Yeah, I've got two in particular. If you indulge me for two. The first one is that alligator gar and gars in general, but particularly alligator gar can drown. So they're classified as what's called a facultative air breather. So they're...

**Dr. Sandra Rideout-Hanzak** [00:22:21] They're mouth breathers then.

**Dan Daugherty** [00:22:24] Yeah. Yeah. They're, you know, going back to what we were talking about earlier, you know, them not having the selective pressures to have to change much over the eons of years or whatever you want to call it. They've been around. One of their adaptations is pretty much to be able to live in any kind of water quality of sorts, even low, low dissolved oxygen, very hot water, warm water, however you want to say it. And how they've been able to do that is, is while they have gills like a normal fish where they exchange oxygen, dissolved oxygen out of the water, their swim bladder, which is for a fish, is the bladder on the inside that that regulates their buoyancy. Essentially, most people think now it's an organ just like a like a balloon of sorts inside. And the more air they pump into that, obviously, the more buoyant they are. And they can rise to the surface or, you know, they can control their position in the water column. If you open up an alligator gar and you look at the swim bladder, it looks like a lung it's highly vascularized, it's pink. I mean, it really looks like a lung. As opposed to like a like a clear balloon swim bladder that you would see in a more modern fish. And so they take in a lot of oxygen through the swim bladder. And when you see them, if you've ever been by a river or a lake or whatever that has a gar in it, all of the species do it. But they'll come up to the surface and they'll just take a gulp. And that air then goes into the swim bladder and they are actually able to take that air out of there, take the oxygen out of that air and supplement their oxygen intake in the bloodstream.

**Dr. Sandra Rideout-Hanzak** [00:24:20] Very cool!

**Dan Daugherty** [00:24:22] And when the water temperatures get really hot in the summer, 80, 90 degrees say, they can actually drown if they can't get up to the surface to get air. They are unable to maintain their oxygen levels and they can actually drown. So yeah, that's a pretty crazy thing to think of. A fish that can drown.

**Dr. Sandra Rideout-Hanzak** [00:24:48] Now, would that happen in the wild, or would they have to be, like, confined below for that to happen?

**Dan Daugherty** [00:24:55] It can happen. So we've had it happen when we're sampling in the summer, like we use these nets, catch them and tag and release or whatever. If they get caught in the net and we don't get them out of there fast enough, they can draw out. But the other way that it happens in more of a natural setting is take for instance, like people, fishermen set out a jug line for catfish. And an alligator gar comes along and grabs the bait and it's swimming around with that jug line. Well if it happens to swim by like standing timber or something and gets that wrapped around the jug line, wrapped around the, the timber, it can't get to the surface to get air. It can drown on a jug line. Matter of fact, a lot of folks I've talked to, fishermen and stuff, say that that they've had quite a few alligator gar on jug lines that are drowned. The second thing I wanted to bring up was that, you know, while we were talking about the trophy/quality-size fish over six feet. About 99% of those are all female fish.

**Dr. Sandra Rideout-Hanzak** [00:26:04] Really?

**Dan Daugherty** [00:26:05] Yes. Male alligator gar do not typically get above six feet in length, and they're usually more like about five feet in length. All the big fish are the females. So that's important from the perspective of a fishery that's very highly targeted toward the large fish is putting in an unequal amount of pressure on those females. And what's even more important is if you think about population persistence, it's always the females that matter, right? They're the ones that carry the eggs. You know, one male can fertilize the eggs of multiple females, but, you know, we need all the females to have all the eggs. So it's something I always bring up with folks that are interested in learning about alligator biology, that those big fish are really the females and the future of the population. So, handle with care.

**Dr. Sandra Rideout-Hanzak** [00:27:06] Yeah. So I guess you have to be really, um, I guess you have to stay on top then, of how many trophies are being taken and that sort of thing so that you don't reduce the population.

**Dan Daugherty** [00:27:20] Right. Yeah. But the good thing that we find with, with the trophy-oriented fishery for alligator gar. It's largely catch and release. Bow fishing is a different story. You can bow fish for alligator gar, but once you've once you shot an alligator gar, it's illegal to release it; that's your harvest for the day. But on the hook and line side, we've had fish that were tagged that have been recaptured three or four or five times. So they're surviving captured and are being able to be recorded again over and over.

**Dr. Sandra Rideout-Hanzak** [00:28:08] Wow. That's really interesting. What are your future conservation goals for alligator gar?

**Dan Daugherty** [00:28:22] Future goals? I think our future goals are probably the goals that we've had since day one, and that's just to continue to manage the fisheries for alligator gar in Texas in a scientific manner. So the more information that we get, the more that we apply that to how we manage. I think we've spent the better part of a decade now getting the basic information that we have needed. Age, growth, recruitment, mortality, all those types of dynamic rate estimates, so on and so forth that have allowed us now to, to really kind of set the course for sustainable management of the populations. And I think going forward we may see some regulations change, but not in a way that is any different, that is counter to what our ultimate goal has always been. And that's just to maintain these quality fisheries in perpetuity.

**Dr. Sandra Rideout-Hanzak** [00:29:27] Okay. Well, I've learned so much about alligator gar. There's a really interesting species.

**Dan Daugherty** [00:29:36] Yeah. It is that. It's been a pleasure to work on them.

**Dr. Sandra Rideout-Hanzak** [00:29:40] I bet. I bet it's made for a really fun career and a very interesting job.

**Dan Daugherty** [00:29:48] Absolutely.

**Dr. Sandra Rideout-Hanzak** [00:29:49] That's cool. Is there anything else you'd like to talk about today?

**Dan Daugherty** [00:29:54] I guess I would throw in there that I would encourage people to go out and fish for alligator gar. Try it. It's not something that, I mean, if you have a heavy rod and some 40 pound power pro, all you need is, you also cut bait and throw it out there and fish in, the in some deep water, slack water areas on your local river where, you know, there's alligator gar. We have an actual dedicated page to alligator gar on our on our TPWD Web page. People can find out where to go fish for them. And I think people will really enjoy, you know, the fight of an alligator gar. Because like I said, you know, how many places can you go and catch a six, seven, eight foot fish?

**Andrew Lowery** [00:30:47] Nothing in the North American fresh water fights or jumps like an alligator gar.

**Dan Daugherty** [00:30:54] The only thing that I would say holds a candle to it is probably a white sturgeon out in the Pacific Northwest. And they get to be 20 feet long. I mean, they are really, really big. The biggest of the sturgeon species, I think, at least in the continental U.S. anyway. I think there's nine species of sturgeon in the US or North America, and they're the largest but another. But as far as Texas fish goes, it's like tarpon of the of the fresh water—freshwater tarpon.

**Dr. Sandra Rideout-Hanzak** [00:31:32] That sounds like fun!

**Andrew Lowery** [00:31:34] And they're a challenge to catch. So it's a kind of a finesse fish with my experience.

**Dan Daugherty** [00:31:40] It's not super high-tech, but it's, you know, you don't catch them on every cast.

**Dr. Sandra Rideout-Hanzak** [00:31:46] Hmm. Okay. And so people can go to your website and get a some hints or some details about how.

**Dan Daugherty** [00:31:54] Yes, we have we have everything on there. We have basic biology information. We have information about how we're managing. We have tips on how to go fish for them. And that can be found at the TPWD website, and then go to the fishing page and then scroll down. You'll see fisheries management, and under there you'll see alligator gar, and that will take you to the to the page that has all that information on it.

**Dr. Sandra Rideout-Hanzak** [00:32:23] Okay, great. Well, I think that's a good place to stop. I hope people will go and fish for gar!



**Dan Daugherty** [00:32:34] Yeah. Yeah, absolutely.

**Dr. Sandra Rideout-Hanzak** [00:32:36] Thank you so much for being here. I really enjoyed talking about alligator gar.

**Dan Daugherty** [00:32:42] I enjoyed it as well.

**Dr. Sandra Rideout-Hanzak** [00:32:43] A Talk on the Wild Side is a production of the Caesar Kleberg Wildlife Research Institute of Texas A&M University-Kingsville. Funding for this project is provided by the Harvey Weil Sportsman Conservationist Award by the Rotary Club of Corpus Christi. Podcast artwork is created by the talented Gaby Olivas. Tre' Kendall contributes with his creative talents as well. And editing is conducted by Andrew Lowery.