BEFORE THE

ARIZONA NAVIGABLE STREAM ADJUDICATION COMMISSION

IN THE MATTER OF THE NAVIGABILITY OF THE GILA RIVER FROM THE NEW MEXICO BORDER TO THE CONFLUENCE WITH THE COLORADO RIVER, GREENLEE, GRAHAM, GILA, PINAL, MARICOPA AND YUMA COUNTIES, ARIZONA.	) NO. 03-007-NAV) ADMINISTRATIVE) HEARING

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COASH & COASH, INC.
Court Reporting, Video & Videoconferencing
1802 N. 7th Street, Phoenix, AZ 85006
602-258-1440 mh@coashandcoash.com

Prepared by:
Gary W. HILL, RMR, CRR
Certificate No. 50812

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BE IT REMEMBERED that the above-entitled and numbered matter came on regularly to be heard before the Arizona Navigable Stream Adjudication Commission, State Senate Building, Hearing Room 1, 1700 West Washington Street, Phoenix, Arizona, commencing at 9:00 a.m. on the 18th day of June, 2014.

BEFORE: WADE NOBLE, Chairman
JIM HENNESS, Vice Chairman
JIM HORTON, Commissioner
BILL ALLEN, Commissioner

Commission Staff:

George Mehnert, Director,
Legal Assistant, Research Analyst

APPEARANCES:

For the Commission:

SQUIRE PATTON BOGGS (US) LLP
By Fred E. Breedlove, III, Esq.
1 East Washington Street, Suite 2700
Phoenix, Arizona 85004
(602) 528-4000
fred.breedlove@squirepb.com

For the Salt River Project Agricultural Improvement and Power District and Salt River Valley Water Users' Association:

SALMON LEWIS & WELDON, PLC
By Mark A. McGinnis, Esq.
2850 East Camelback Road, Suite 200
Phoenix, Arizona 85016
(602) 801-9066
mam@slwplc.com

For San Carlos Apache Tribe:

THE SPARKS LAW FIRM, PC
By Joe P. Sparks, Esq.
By Julia Kolsrud, Esq.
7503 First Street
Scottsdale, Arizona 85251
(480) 949-1339
JoeSparks@sparkslawaz.com

For Freeport Minerals Corporation:

FENNEMORE CRAIG, PC
By Sean T. Hood, Esq.
2394 East Camelback Road, Suite 600
Phoenix, Arizona 85016
(602) 916-5475
shood@fclaw.com

For Gila River Indian Community:

By Thomas L. Murphy, Esq.
Assistant General Counsel
525 W. Gu u Ki
Post Office Box 97
Sacaton, Arizona 85147
(602) 562-9760
thomas.murphy@gric.nsn.us

For Arizona State Land Department:

ARIZONA ATTORNEY GENERAL'S OFFICE
By Paul A. Katz, Esq.
By Joy Hernbrode, Esq.
By Laurie Hachtel, Esq.
1275 West Washington
Phoenix, Arizona 85007
(602) 542-7785
paul.katz@azag.gov

For Maricopa County:

HELM LIVESAY & WORTHINGTON, LTD
By John Helm, Esq.
By Jeffrey L. Hrycko, Esq.
1619 East Guadalupe Road, Suite 1
Tempe, Arizona 85283
(480) 345-9500
helm.john@hlwaz.com

GARY W. HILL, RMR, CRR
Certified Reporter
Certificate No. 50812

CHAIRMAN NOBLE: Gary, will you show that all Commissioners but Commissioner Allen are present, and Counsel and George are here.

Mr. Katz, will you begin by introducing Mr. Farmer?

MR. KATZ: Most definitely.

DONALD D. FARMER

called as a witness on behalf of the State Land Department, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KATZ:

Q. Mr. Farmer, I'll give you the honor. Would you please tell us your full and correct name?

A. Donald D. Farmer.

Q. And would you tell us a little bit about yourself, your education and work related experience?

A. I was born in Phoenix, 1955. Raised in Phoenix and Christopher Creek, Arizona. My work experience has been in construction. I've been a painting and coatings contractor for the last 35 years.

Education, I've got an Associate in Applied Science and Building Safety and Planning Technology, and I've finished with a bachelor's equivalent at N-A-C-E,

which is NACE. I went through their international coating inspection program.

Q. And you're not here today as an engineer or a scientist with respect to issues of geomorphology or hydrology, correct?

A. No, I'm not.

Q. And you're not educated as a historian, that is, you don't have a bachelor's, master's or doctorate degree in archaeology or history?

A. That's correct.

Q. And tell us a little bit though about your boating experience. How long have you been boating in Arizona and in the southwestern United States?

A. I started boating while I was still in high school. Pretty much all of the Arizona rivers. Anything that had water in it. I was pretty much there in the summertime and when I was not in school.

Q. And during the course of the last, what, 25 years or longer?

A. Oh, probably longer than that.

Q. Okay.

A. It would be more like 40.

Q. And have you had the opportunity to boat the Colorado River?

A. Yes, I have boated the Colorado River. I've

been through the Grand Canyon on private trips six times, and I've boated the lower Colorado River with Boy Scout groups.

Q. And have you also had the opportunity to boat portions of the Verde River?

A. I've boated the Verde River from the headwaters south of Chino Valley all the way down to the mouth of the Salt River.

Q. And have you had the opportunity to boat at all down the Salt River?

A. I've boated the Salt River through the wilderness section, which starts at the Highway 60 Bridge in Salt River Canyon down to the Young Road Bridge at the top of Roosevelt Lake, and I've boated the section below Stewart Mountain Dam down to Granite Reef.

Q. And have all of these trips of yours been on diminished flows as the result of damming and diversion, if you know?

A. The Verde River trips above Horseshoe have all been on a natural flow regime in regard to dams. There are no dams above Horseshoe. The Salt River Wilderness is again an undammed flow, and the flows on the lower Salt River were dam-regime water flows.

Q. Have you also had the opportunity to boat the San Juan River and Green Rivers in the State of Utah?

A. Yes, I have.
Q. And has that been just on a single occasion or on multiple occasions?
A. Multiple occasions on both rivers. The San Juan River being basically a springtime run. It was work-related time off, when I could get the time off, and the Green River was in the autumn months.
Q. And the San Juan, how often have you boated that?
A. We try to do it on an annual basis.
Q. So you've seen it at different flow rates?
A. Yes.
Q. And the Green River, how many times in the last five years, if you recall, have you boated the Green River, which is a tributary to the Colorado River, correct?
A. I've boated that twice in the last five years, basically the reach from Gates of Lodore through Split Mountain.
Q. And where else have you done boating?
A. I've boated extensively in Idaho, the middle fork of the Salmon River multiple times. The main Salmon River, the Selway River, Lochsa River. Spent a good bit of the springtimes and summertimes in Idaho.
Q. And a year as we all know is 365 days, at

least, except those leap years. But how often or how many days a year do you average on various rivers in Arizona and in the southwestern United States?

A. I've generally averaged somewhere between 30 and 45 days out of each year on the river.

Q. And have you had the opportunity to review Jon Fuller's two PowerPoint presentations that we have been using -- I'll tell you, we've been using them during Mr. Fuller's presentation. Have you had a chance to read and review both his boating PowerPoint presentation and his Gila River segmentation/navigability presentation?

A. I've reviewed both reports on CD.

Q. And do you believe that, from your own personal experience on the Gila -- well, let me ask you. How familiar are you with the Gila River here in Arizona?

A. I'm fairly well-versed on most of it.

Q. And have you, if not boated the entire river, have you seen portions or almost all of the segments of this river visually?

A. Yes.

Q. And have you done any reading or studying about the Gila River? And I'm not suggesting in a scholarly or for a degree-related program.

A. I have not focused on the historic boating record of the Gila River, per se, but I have come across anecdotal information on that through the years.

Q. And there is anecdotal information related in Mr. Fuller's PowerPoint presentations regarding the Colorado -- excuse me, regarding the Gila River, correct?

A. Yes, I've seen that.

Q. Do you have any reason to disagree with his descriptions that are contained in that report?

A. I would say that his use of the available data on that historic record is as accurate of a report as could be made.

Q. And again, you're not giving that opinion based upon scientific knowledge or training, just your practical or pragmatic river boating experience on the Gila River?

A. That's true.

Q. And would you tell us what type of -- let me just check my notes for a second. Oh, what is your familiarity with historical boats that were used prior to Arizona statehood in 1912, such as canoes, rafts, flatboats, whether they were built or used by Native Americans, settlers, or the military?

A. Again, what my information is would be

anecdotal reading of prehistoric natives, and it wasn't boating per se but sometimes boating would come into it. I've read other works of historical accounts of boating various rivers and some of the craft that were used.

Q. And what type of boats have you had the occasion to take down rivers here in Arizona?

A. I've boated in everything from inflatable round rubber rafts to inflatable catarafts to canoes to sit-on-top plastic kayaks to inflatable rubber kayaks.

Q. And are you familiar with both the design of historic as well as modern canoes?

A. Somewhat.

Q. And are canoes your favorite means of transportation down the Arizona rivers?

A. Canoes hold a special place for me. They are by far the most complex craft to navigate, but they are the epitome of being at one with the river, and canoes have a dynamic that you can get a canoe into places that you can't get other types of craft at certain water flows.

Q. And with respect to the design of a canoe, from your review of historical accounts as well as your boating experience, is there any significant difference in the design of a canoe that was being used in the 1800s and a canoe that you would be using today?

A. The design of a historic canoe compared to the design of a modern canoe is virtually indistinguishable.

Q. And has that been true for hundreds, if not thousands, of years?

A. I don't know about thousands of years, but going back into what I've read, the comparisons can be easily seen in the shape and design of the boat.

Q. And what's the primary distinction between some of our modern canoes and historic canoes in terms of the materials used to construct them?

A. The historic boats were generally made out of wood, and sometimes they would use skins. Sometimes they would use fabric in later years. The newer boats, while there are many historical restorations made to this day and used, the modern boats that you would navigate the rivers with would be made of plastic.

Q. And there are some racing canoes or other high-water canoes that might be made out of fiberglass or Kevlar, but those materials are not more durable than wood, are they?

A. I would say that a fiberglass or Kevlar constructed boat would be less durable than a historic wood boat or a canvas boat or a skin boat.

Q. And I may have misspoken. I said Kevlar is a fairly durable material. I meant to talk to about

carbon fiber. Is that a very durable material to use in a boat?

A. Any of the fiber boats are fairly fragile when it comes to impact with rocks and logs and those type of obstructions. They don't have the give that plastic does.

Q. And have you taken trips down any of the rivers in wooden canoes here in Arizona or in the southwest?

A. I've not personally done it. I do know folk who have.

Q. And have you ever been on trips with other folks that were using wood canoes?

A. I have.

Q. And did they have any more difficulty navigating these Arizona rivers in their wooden canoes than you did in a plastic canoe?

A. The one fellow who I boated with who was in a wooden canoe was quite a bit better of a boater than I, and he just made it look wonderful. He had no problem at all.

Q. And when you take a boat, whether it's wood or plastic or whatever material, are you prepared to repair that boat in the event that you hit a rock or punch a hole in it?

A. I carry an emergency repair kit with every boat that I own.

Q. And has it been your experience that both historically and at present that most folks that boat are prepared to do a repair of that boat should it become damaged during their trip?

A. That's true in today's boating world, and from what I've read, that was true in the historical accounts.

Q. Meaning, if you had a trader or a trapper that was regularly using a canoe down rough water or water that had obstacles such as rocks in it, is it your understanding from your review of historical accounts that people generally were able to repair those boats?

A. I would say in a lot of the cases that the person actually constructed the craft with tools that he had and those tools likely went down the river with him.

Q. While you may have had some dreams of boat building, have you actually done any boat construction or building at this stage of your life or career?

A. Well, that was one dream was to build a northwest river dory and use it in the Grand Canyon. I've so far not got past the study stage of it. I did start the construction of a reed boat made out of natural materials found along the Verde River, but that

project also has fallen on the wayside due to work constraints.

Q. And when we talk about dories, are those flatboats that have been used and are currently being used to navigate the Colorado River?

A. Yes.

Q. Let me just have our focus shift now to the Gila River. What segments -- you're familiar with Jon's various segmentation of the river from his reports, correct?

A. That's correct.

Q. And Segment 1 is the river from New Mexico to the Gila Box. Are you familiar with that segment of the river?

A. Only by driving along it.

Q. And why is it that you haven't boated that particular segment? Is it because of a lack of flow or water?

A. No, it's not because of a lack of flow of water. From the New Mexico state line to the Old Safford Bridge, which pretty much delineates that section of the river, it flows through a valley that has high agricultural use. There's lots of irrigation diversion and fence lines and settlement, and it's just never been a section of river that I've chosen to boat.

Q. Is it a very interesting segment that you would get excitement out of boating?

A. It's pastoral countryside. It's beautiful. It's green. There's a lot of people there, you know, agricultural people and there's cows and that. It's a pretty land. It's just not a place I've chosen to boat.

Q. And you mentioned fences, do some of those fences, barbed wire or otherwise, run across the river and are they obstacles, at least, if not obstructions to boating?

A. The barbed wire fences do indeed cross the river, and they're not always friendly to boating. They're designed to keep cattle controlled. They're really not an obstacle. They're more of a delay structure. You can generally get a boat under them, over them, through them somehow. It just slows you down.

Q. From your trips, have you had frequent trips along that segment of the river, not in the water, but alongside it?

A. That's usually the route that I take when I'm going to boat sections of the Gila that lie in New Mexico, so yes, I'm on that road a bit.

Q. And even though you haven't done hydrological measurements of that particular segment, have you ever

seen that segment completely dry?

A. No, I have not.

Q. But again, you're not intimately familiar with that particular segment with respect to boating experience?

A. That's correct.

Q. What about Segment 2, which is the Gila Box?

A. Yes, I've boated that section.

Q. And do you know what times of year you have boated that section in, let's say, the last five to ten years?

A. The last five years I've boated that section in the springtime.

Q. And would that be -- well, when you say the springtime, what months, if you can recall?

A. Generally springtime for boating would be in, in the Gila would be March.

Q. And have you -- what segment -- there's a map behind you of the Gila River Segment 2, the Gila Box. If you want to use the pointer, you can. But can you show this Commission, if you would, please, the areas of that particular segment? And I know this map isn't as detailed as some of the others with respect to roads. But can you --

A. Sure.

Q. -- give us an illustration of where you may have boated along that Segment 2?

A. Sure.

MR. KATZ: Is it okay if he approaches? I don't know if he'll have a microphone but --

VICE CHAIRMAN HENNESS: Talk up.

THE WITNESS: Sure, thank you.

BY MR. KATZ:

Q. Try to speak up, if you would.

A. The reach Section 2 starts at the Old Safford Bridge, which is Highway 181. It's designated by this red spot on the river, and it runs and courses along down through the Gila Box Wilderness Area down just above the irrigation diversion dam -- and I don't recall the name of that dam. It's down close to Bonita Creek.

Q. Have you boated your canoe or various boats down that entire segment?

A. I've been on this in rubber round rafts, in catarafts, and in canoes.

Q. And would that be the entire segment that you on one occasion or more have boated through?

A. That's correct.

Q. You may resume your seat. Thank you.

And in Segment 2, have you had occasion to view that segment at other times or to boat that segment

at other times? You said you usually go in the spring. Have you gone at any other times of the year or seen the water flowing in Segment 2 at any other times of year?

A. I've seen it in the summertime.

Q. And have you ever seen the segment completely dry?

A. No, I have not.

Q. And how many -- what were the flow rates or CFS rates that you've experienced in the last five or ten years of trips down the Gila, the Segment 2?

A. The lowest flow I've been down that segment was 300 CFS, and the highest flow was approximately 900 CFS.

Q. And in your experience down that entire segment, what has been the range of depth that you have experienced in the river?

A. The shallowest spots in some riffles were possibly 16 inches deep, and the deepest spots in the holes could be up to 20 feet deep.

Q. Have you ever had any major difficulties in navigating a canoe or other boat down that segment?

A. No, I have not.

Q. And let's talk more specifically about canoes. How many canoe trips do you believe that you've taken down Segment 2?

A. Two.
Q. And have you ever been unable -- have you ever had to get out of your boat because of any type of obstacle or obstruction and take your gear out of that boat and carry the boat and those goods down 50 feet or a mile and portage that boat and get back in?
A. No, I've never had to do that on that reach of the Gila River. The only obstructions in there would be man-made. There are two barbed wire fences at two different pieces of private property that you have to stop your boat and get out of your boat and ease your boat under the fence. But I've never had to unload the boat for any reason.
Q. And again, Segment 1, which flows into this Segment 2, you have indicated is significantly diverted for agriculture?
A. That's correct.
Q. And you indicated at the end of Segment 2 there's a diversion dam. I'm supposing that that's for agricultural purposes as well?
A. It would be for agricultural purposes in the Safford Valley, yes.
Q. And you haven't boated, it's my understanding, Segment 3; is that correct?
A. I have not boated Segment 3 of the Gila River.

Q. And that is the Gila Box to the San Carlos Reservoir or the Coolidge Dam, correct?

A. That's correct.

Q. And why is it that you haven't chosen to boat Segment 3?

A. There's two reasons. One, a good portion of that reach flows across the San Carlos Indian Reservation, and whether it's legal to be there in a boat is questionable.

The second would be, would be irrigation diversions and fence lines and such, and the flat nature of the Safford Valley; it just has not been a destination that I choose to go to.

Q. Have you had the opportunity to drive along or hike along any of Segment 3?

A. Yes.

Q. And have you ever seen Segment 3 appear in its flow channel to be dry?

A. No, I've not.

Q. Always water flowing --

A. Some, yes.

Q. -- from your experience?

You have boated though Segment 4, which is the San Carlos Canyon, which is from the dam down, is it to Winkelman?

A. That segment, Mr. Fuller has designated that segment to end just above Winkelman.

Q. And behind you, again, is a map of Segment 4. If you would, could you just illustrate for the benefit of the Commission and those present the segments of or the portions of Segment 4 that you've had occasion to travel down by boat?

A. Sure. Segment 4 starts right at the base of Coolidge Dam, and courses down through the Needle's Eye Wilderness, which is mostly BLM land, down to approximately Dripping Springs area that is just upstream of Winkelman about six miles.

Q. Okay. And have you had the occasion to boat that entire segment or just portions of it?

A. The entire segment.

Q. And you may resume your seat.

What type of boats have you used to navigate this particular segment of the Gila River?

A. I've only boated this segment in canoes.

Q. And what time of year have you boated this segment?

A. This segment is a little bit interesting, as it's a dam-flow regime. In the wintertime I've seen this reach completely dewatered as they're storing agricultural irrigation water behind Coolidge Reservoir,

and the major flows are in the summertime during the agricultural release, so my experience on this reach would be summertime boating.

Q. So the summertimes, would it be your conclusion because of the way the dam controls the irrigation, that the flows would be greater in summertime than ordinary and natural?

A. That's correct.

Q. And in the wintertime, the flows below the dam would be lower than normal because there's a reservoir there collecting water?

A. That's correct.

Q. And what are the flow rates that you've had occasion to boat down this particular segment?

A. I've boated this reach of the Gila as low as 50 CFS and as high as 450 CFS.

Q. And what have been the average depths that you've experienced in those various trips down Segment 4?

A. I've not seen the water any shallower than six inches.

Q. And I didn't ask you this yet, and I was going to save it till later. But how much water -- backing up. When you say it's been as low as six inches, is that throughout the entire course of your trip or is

that just riffles or shallower areas of the river that you've hit?

A. That would be the shallower spots.

Q. And that is as low as six inches, but do you have any idea or can you give us an idea what the average depths were down your various trips, the range?

A. I would say that the average depth of the river at that flow would be anywhere from two to four feet.

Q. And is there any problem boating or navigating a canoe down two feet or four feet of water?

A. Absolutely none.

Q. Have you had any problem using any of your canoes down six or eight inches of water?

A. No, the canoes that I own generally will handle water that's two inches deep, down to two inches.

Q. And have you had experiences down this segment of the Gila where you might hit a riffle or a pocket that is only two or three inches deep?

A. You could at lower flow, yes.

Q. And have you ever had to get out of your boat, unload it and portage it 50 yards or a mile and then get back in, or were you able to continue boating despite an occasional very shallow spot?

A. I've never had to unload the boat to continue

downstream.

Q. And have you had any opportunities to boat down Segment 5 of the river?

A. Segment 5 of the river --

Q. Which would be the San Carlos Canyon to the Ashurst Dam?

A. Yes, I have.

Q. And how many times have you done that?

A. Pretty much all summer long. Probably four or five times during the summer. In the past 15 years, we've boated that.

Q. So you've had quite a few experiences on Segment 5 from San Carlos Canyon to the Ashurst Dam?

A. Yes, and it is a summertime flow, and not much else is flowing that time of year, so it is a go-to destination during the summer.

Q. And would you go now up to the map that depicts the Gila River Segment 5 for us, and all of these maps are in evidence, and I can give for the record the citation later. But show us the various portions of that segment that you've had occasion to boat.

A. My major experience in this reach is from Dripping Springs Wash, which is the start of this reach, down to the park in Winkelman. It's a very nice day

run, and it has a little bit of excitement at higher flows, which would be up to 700 CFS. The flow from Winkelman down to Kearny through Kelvin and onto the diversion dam just upstream of Florence, it flattens out a good bit more, and it's a fun trip. It's a few more miles, so it would be an overnight type boating experience.

Q. And along both Segments 4 and 5, are there agricultural diversions that are obvious to the person sitting in the river?

A. No.

Q. Okay. But it's below Segment 5 that there are diversions?

A. The major diversion would be the Ashurst-Hayden Dam where they pretty much dewater the Gila River.

Q. And from that point down, because of that dam, there is oftentimes no flow from what we have labeled Segment 5 into Segment 6?

A. I would say that the only time there's water would be when some tributaries might flash in the monsoon season or when there's a catastrophic flood event.

Q. Thank you. You may be seated.

And down your travel -- and you haven't had

occasion to boat or navigate sections -- or Segment 6, 7, and 8, correct?

A. No, I have not.

Q. Because as a result of damming and diversion, at least in your observation, those segments are, except for -- well, have you ever boated the Segment, is it 6 that has the effluent in it?

A. Yeah, Section 6 downstream of Phoenix down to Painted Rock Reservoir is an interesting flat-water boating experience. If you're a birder or you like wildlife, it's a very interesting place to boat.

Q. Now, backing up to your experience on the Gila River in Segments 2, 4 and 5, are there any rapids that you have encountered at the various flow rates that you've described?

A. Yes, there's rapids in the river.

Q. Are any of those a significant detriment to your ability to successfully navigate down those segments of the river?

A. No, they're not.

Q. And are they difficult rapids? Or what class of rapids are they?

A. The Gila at the flows that I've boated would be Class II rapids, and at some flows they could approach Class III rapids.

Q. Would you believe from your experience that those rapids appear to be dangerous to a boater?

A. I would say that if you were a beginner boater, some of the rapids could pose some danger.

Q. And is that like at a Class III level?

A. At a Class III level.

Q. A novice, though, could boat most Class IIs?

A. I would say a novice boater, there's a couple of places where he should get out and scout the rapid and plan his descent through it.

Q. Now, you're an experienced boater, you said with almost 40 years of experience, correct?

A. That's correct.

Q. Are you a better boater and more capable pilot today than you were when you were a teenager or in your 20s?

A. Experience and older age is everything, I think.

Q. And also with respect to particular rivers, you've boated some rivers that have had Class IV and V rapids on them, correct?

A. That's correct.

Q. And the first time you've ventured down those rivers, was that significantly more difficult than later trips that you took once you understood better the

dynamics of that river?

A. Yes. I don't know how much more difficult it was. It was certainly more exciting.

Q. And you have indicated that you've reviewed Mr. Fuller's various presentations. I know you're not a hydrologist, but do you have any reason to dispute his descriptions of the geology or geomorphology or flow patterns of these various segments that you've boated?

A. I found his descriptions to be quite accurate.

Q. The other thing I wanted to ask you is, are there any waterfalls on the Gila River?

A. No, there's none.

Q. Have you ever seen beaver dams on the Gila River?

A. I've not seen a beaver dam.

Q. Have you seen beaver or beaver sign though on the river?

A. Absolutely.

Q. So has it been your experience that beavers are bank dwelling or dam dwelling along the various segments of the Gila River?

A. My experience is they have been bank-dwelling beaver.

Q. There has been some suggestion to this Commission that boating on a river that has a lot of

beaver dams is an obstacle or even an obstruction to being able to successfully navigate down a river. Has that been consistent with your experience?

A. I have boated rivers that have beaver dam, and the beaver being the marvelous engineers that they are, always leave a spillway to avoid damage to the dam, and I've been able to successfully boat right down that spillway.

Q. And you can either go down the spillway or you can go right through the dam; is that correct?

A. Right over the top of it, sure.

Q. And is that going to cause you to get hung up or capsize?

A. It's not been my experience.

Q. Let's go back to the type of boats that you have or that you used. What type of canoe or canoes do you own or operate?

A. Right now my stable of boats, I have four canoes of various lengths, and I use them for different durations and types of water.

Q. And what type of -- go through each one for us. What is the smallest of those canoes?

A. I own a 14-foot whitewater canoe. It is basically for big, pushy whitewater.

Q. And that doesn't have the historic hull

design, correct?

A. That's subjective. The hull design on it is pretty much that of a canoe. It's just that it has more rocker in it.

Q. And that's curve?

A. It's curved like a banana from fore to aft, if you will, and that allows for higher degree of maneuverability in bigger water.

Q. And what is the load capacity of that canoe?

A. That canoe, that 14-footer is rated at 700 pounds.

Q. And whether it's just you in it -- and I don't know whether you're 175 or 200 pounds -- but when it's just you in it without any gear, what is the draw or draft of that boat? You know, how much water do you need to float it to begin with?

A. Empty, that boat will draw between an inch and a half and two inches of water -- -

Q. Okay.

A. -- with just myself in it.

Q. And you set it at a capacity of how much?

A. 700 pounds.

Q. If you filled it up with people, goods of 700 pounds, what would be the change in the draw or draft?

A. It would probably pull it down another half an

inch.

Q. Okay. So there wouldn't be a significant difference in your experience in a fully loaded --

A. No.

Q. -- 14-footer?

A. No.

Q. And a near empty one?

A. That's correct.

Q. And does it matter whether the goods being carried are people or food or furs?

A. No, it doesn't matter.

Q. And what is the next size boat that you own or operate?

A. I own a 16-foot canoe.

Q. And what is its load capacity?

A. Its rated capacity is 850 pounds.

Q. And what is its draft with just you in it, if you know?

A. I use that boat for extreme low flows down to 26 CFS. It is fairly flat-bottomed. It draws with just me in it perhaps an inch.

Q. And if you put the full, what did you say, 800 pounds?

A. 850 pounds.

Q. If you put the full 850 pounds in it, how much

deeper into the river do you sink?

A. It might pull it down an inch.

Q. Is that going to make any significant difference in terms of your ability to navigate through the Gila River segments that you're experienced with?

A. No, none at all.

Q. And what's the next size canoe that you own or operate?

A. I've got an 18-foot canoe.

Q. And what is its load capacity?

A. That boat will take 1,300 pounds.

Q. And when it is just you on that boat, nothing else, what is its draw or dip in the depth of the river?

A. Maybe three-quarters of an inch.

Q. And if you filled it up to the full 1,300 pounds with passengers and camping gear or goods, what would be the change in its draft?

A. It would go down somewhere inch and a half to two inches.

Q. So would that make any significant difference in your ability to use this boat on the flows you've experienced in the Gila River?

A. No, and actually, a heavier-ladened boat makes it easier to get down the river. It has a little bit more stability and a little bit more momentum than a

lightly-loaded craft.

Q. And what is the boat that you have most often taken down the Gila, the various segments of the Gila River?

A. Oh, probably the Gila, I've used the 14 and the 16 on the Gila.

Q. And do you have any other canoes that are any larger than the ones you've described?

A. I've got a couple on the boat racks that I use very seldom anymore.

Q. And what would be your boat of choice? I may have already asked you that, and does it vary from segment to segment or season to season on the Gila?

A. Yes, it would. It would depend on what the flow level is, and what you were trying to do. Like if you took Reach 4 above Winkelman at a 700 CFS flow, I would opt for the whitewater boat; and if it were a low flow, I would opt for one of the bigger flatter design boats.

Q. But again, you haven't had to leave your boat because of obstructions on the Gila River or to unload it, have you?

A. No.

Q. And we've heard things -- we've talked about beaver dams. We've talked about rapids. What about,

what are strainers?

A. Strainers are obstructions in the flow. Generally they are trees that have roots or branches overhanging or actually go into the water.

Q. And what's been your experience with the growth of willows, tamarisk, and other vegetation below the Coolidge Dam?

A. They seem to have gotten thicker in places where they're below the dam than up above the dam, and I suspect that's probably due to a lack of flushing spring flows that would control that growth a bit.

Q. And have you ever had to boat on the Gila River or other rivers through sandbars?

A. Yes.

Q. Are sandbars a problem along any of the segments of the Gila River, even at the low flows that you have boated?

A. I've never had to get out of the boat because of a sandbar.

Q. What do you do when you hit a sandbar or you observe one because of the water flow ahead?

A. You generally go around it. You maintain your boat position in the deeper water.

Q. And can you usually tell where sandbars are before you get hung up on one?

A. Yes, they have a distinct look about what it does to the water.
Q. And what about rocks in the river?
A. There's lots of those.
Q. Can you usually see them at the flow rates that you've been at so as to be able to avoid colliding with them?
A. Most of the time you take a trip, you're going to make contact with rocks, and it's basically due to water clarity. If you can see them, you can avoid them. If you can't see them, you can't.
Q. And you've indicated that there are portions of the Gila River that you've either boated down or observed that have fencing across them, correct?
A. That's correct.
Q. And is that a greater obstacle than naturally occurring phenomenon such as sandbars, rocks, rapids, and strainers?
A. They're quite dangerous. Yes, they will force you to stop and reconnoiter your route through them.
Q. And in going through Mr. Fuller's flow rate data -- and again, you didn't study or memorize that data, correct?
A. That's correct.
Q. But you did take a look at the median or 50

percent of the time flows as well as his low flow rates?
A. Yes.
Q. And any reason to dispute the median and low flow rates or the depths that are described by Jon Fuller in his report?
A. No. I couldn't dispute it. His choice of craft at those various flow rates seem to be accurate.
Q. When you take a trip on -- you said you usually use your 16-foot boat?
A. Yes, I take that often.
Q. How much gear do you usually take with you?
A. Oh, we can load that boat with two people or one person, solo or tandem; and if we're going overnight, we can take a tent, sleeping bags, sleeping pads, stove, table, food.
Q. Some issue has been made that if you capsize a boat, you're going to lose your gear or equipment. Has that been your experience?
A. The boater's creed states that if you don't want to lose it, you tie it in.
Q. And do you regularly secure your gear so as to avoid it falling out of the boat in the event of a capsize?
A. One hundred percent of the time.
Q. And in boating the Gila River over -- how many

years have you been boating the Gila? You talked about the last five, but how many years have you on and off boated the Gila River?

A. I discovered the Gila River probably around 20 years back.

Q. Have you ever capsized --

A. Yes.

Q. -- a boat?

A. Yes.

Q. Have you lost your gear?

A. No.

Q. Were you able to get back in the boat and continue on your trip?

A. Yes, empty the boat out and go.

Q. And some of your stuff may have gotten a little wet or soggy, but it was still usable or preserved?

A. We store things that need to be kept dry in dry bags.

Q. And some of that technology to keep things dry might not have existed at statehood, correct?

A. Well, there were methods to keep gear dry back then.

Q. And do you know what some of those methods might have been?

A. Sure, would have been oil canvases, roll-down bags. There were some rubberized products then.

Q. And you indicated familiarity with some of the dories or flatboats that are used on the Colorado?

A. Yes.

Q. And they had some compartments in them for storage that might have been watertight?

A. Watertight compartments, that's correct.

MR. KATZ: Joy, may I confer just a minute?

BY MR. KATZ:

Q. I just want to clarify one final point, and that is, have you had to portage or pick your canoe out of the water on any of your trips down the Gila River?

A. No.

Q. And that includes at times that there were very low flows below those which Mr. Fuller projects as ordinary and natural low flows, correct?

A. I've never had to portage on the Gila River.

CHAIRMAN NOBLE: Mr. Katz, excuse me for a moment.

Gary, please reflect that Commissioner Allen has arrived. Go ahead.

BY MR. KATZ:

Q. And again, I believe that I am done with the questioning of Mr. Farmer. Well, let me just ask you

one other question. Is there anything else that you think that we might benefit from hearing from you with respect to your experiences in boating the Gila River?

A. In regards to?

Q. The ability to do it or the types of boats used and so forth?

A. Well, I think there's a lot of potential for boating on the Gila River, recreational boating, and commercial boating on the Gila River. It seems to be an underutilized resource that brings huge economic benefit or has the potential to bring huge economic benefit to rural Arizona which is, as we know, sorely needed.

Q. And then again, by choice though, much of rural Arizona is rural and engaged in agriculture and not boating?

A. That's true.

MR. KATZ: I'm done at least with respect to the direct examination of Mr. Farmer.

CHAIRMAN NOBLE: Is there anyone else who wishes to examine Mr. Farmer?

COMMISSIONER HORTON: Mr. Chairman, I have a question.

CHAIRMAN NOBLE: Yes.

COMMISSIONER HORTON: I've been on a few boat trips. How do you measure CFS when you're in your

individual boat or trip with a group of people?

THE WITNESS: Mr. Chairman, Commissioner Horton, basically the way I would measure it is I will check the USGS website for their gage on the CFS, and over time, one becomes adept at being able to guess what the flow is within, say, 20 or 30 CFS.

COMMISSIONER HORTON: Thank you.

THE WITNESS: Sure.

CHAIRMAN NOBLE: Any other questions from the Commissioners?

Mr. Hood?

MR. HOOD: I have a few questions, Mr. Chairman. Thank you.

CROSS-EXAMINATION

BY MR. HOOD:

Q. Mr. Farmer, good morning.

A. Good morning, sir.

Q. My name is Sean Hood. I represent Freeport Minerals Corporation in these proceedings.

I want to back up a little bit. Did you say you spent part of your childhood in Christopher Creek?

A. I did.

Q. Where is that?

A. 26 miles east of Payson on Highway 260.

Q. And were you born in Phoenix and then moved to Christopher Creek?
A. I spent a good bit of each year in both places.
Q. Were there creeks and streams in and near Christopher Creek that you boated in the past?
A. I've boated Tonto Creek which is not far from Christopher.
Q. Okay. And what kind of craft have you used on Tonto?
A. Canoe.
Q. And what kind of canoe?
A. Whitewater canoe.
Q. What size?
A. 14 foot.
Q. Is that the same 14-footer you have today?
A. It is.
Q. So is this recent boating on Tonto, given that you still own that canoe?
A. In the past and recent.
Q. Well, when was the first year that you think you boated on Tonto?
A. I was in my late 20s. That would have been somewhere in the 1980s.
Q. What kind of depths did you have on the Tonto?

A. There's probably places that are a foot deep and there's places that could be 40 feet deep through those canyons.

Q. How many times have you boated Tonto, estimate for us your best.

A. I would say a dozen times.

Q. So you would say that Tonto is a navigable stream? You're able to boat up and down it in a canoe?

A. It's been my personal experience that I've been able to successfully navigate it.

Q. You don't know whether Tonto is a navigable stream for purposes of title under the Daniel Ball Test though?

A. I don't have any idea.

Q. What other streams, creeks, rivers in Arizona have you boated on?

A. I've boated the Verde River from top to bottom, the Salt River, the Gila River. There could be a creek here or there thrown into it. Sycamore Creek or Babacomari.

Q. What about the San Pedro?

A. No, I've not boated the San Pedro.

Q. Why is that?

A. There's not been enough flow in it.

Q. Where is Sycamore Creek?

A. Sycamore Creek, the Sycamore Creek that I would speak of would be the one that Highway 87 crosses around Sunflower.

Q. How many times do you think you've put a canoe or other recreational craft in Sycamore?

A. I've come down it twice.

Q. What did you use?

A. Canoe.

Q. Which one?

A. The 14-foot whitewater.

Q. Let's talk a little bit about your canoes. I think you said you currently have four in your stable; is that right?

A. Yes, I've got four.

Q. Maybe you've got one that's older that you don't use anymore?

A. Yes, it's up on horses. It's not being used.

Q. So we talked a little bit about your 14-foot whitewater. What is the make and model?

A. It is a Mad River Encore, E-N-C-O-R-E.

Q. And what materials is the Mad River Encore made out of?

A. It is plastic.

Q. Do you know what kind of plastic?

A. It's the kind they just discontinued. Excuse

me, I'm working on a ten-second delay today probably. Maybe 15. Royalex.

Q. Royalex?

A. Royalex.

Q. And that's not a material that was available in 1912, to your understanding?

A. No.

Q. And using that 14-foot Mad River Encore whitewater canoe, have you ever hauled lumber?

A. No.

Q. Have you ever hauled mining supplies, agricultural supplies up and down a river?

A. No.

Q. And I think you said this one could hold one or two people?

A. Yes, it could be set up tandem or solo.

Q. And is that true for all four of your canoes?

A. No, it's not.

Q. Which ones can you do solo or tandem?

A. They could all be set up solo or tandem except for the one that's up on horses and it's exclusively a solo boat.

Q. And did you describe the one that's up on horses when Mr. Katz was speaking with you?

A. I didn't.

Q. So let's keep it to the four, I think that you currently consider as part of your stable. And I missed one of them in my notes.

A. It would have been three.

Q. Oh, okay. So you really talked about three and you've got another one you're just not using?

A. Correct.

Q. What is the one that's up on horses, what is that?

A. It's a Mad River, it's a flat water small lake boat. It's flat and it's a solo boat. It's 12 foot in length.

Q. And what material is that made out of?

A. It would be Royalex.

Q. Have you used your 12-foot small lake solo canoe on streams in Arizona?

A. I have boated the Verde River with it.

Q. I assume in that kind of craft you've never hauled lumber, transported mining supplies, agricultural supplies, et cetera?

A. No.

Q. And again, that was made out of the same material as your 14-foot whitewater Royalex which is a plastic that's a modern day material?

A. Correct. Uh-huh.

Q. Your 16-foot canoe is what make and model?
A. It's an Old Town Discovery.
Q. What material is the Old Town Discovery made out of?
A. It's polyethylene.
Q. Is that also a kind of plastic?
A. It is plastic.
Q. Which -- between the Royalex -- am I saying it right? Royalex or --
A. Royalex.
Q. Royal, with an R?
A. Exactly.
Q. Great. Between the Royalex and the polyethylene, which in your experience is the more durable material?
A. The polyethylene is quite a bit more durable than the Royalex.
Q. Which one of those two materials do you think has the -- is most advantageous from a buoyancy perspective in terms of minimizing the draw of the craft?
A. While the polyethylene is a little bit heavier and it's multi-layered, I would venture that the weight is negligible when compared with the draft of the boat.
Q. You talked about, the three boats you talked

about, you did mention different draws on those craft, correct?

A. Yes.

Q. And I neglected to write down the draw on your 14-foot whitewater; what is that?

A. Empty it would be about an inch and a half or so.

Q. Do you believe -- is it your understanding that wooden dugout canoes around the time of statehood would have had a one and a half inch draw?

A. That I don't know.

Q. You just don't know. You've never boated in them?

A. I've never boated in a dugout log.

Q. What about other forms of wooden canoes? I know you said you haven't boated in them but you've been with people who were using them. How do their draws compare with this one and a half inches? You have another boat that's one inch. You have another boat that's three-quarters of an inch.

A. They're similar designs, so the draw of the boat in the water would be similar to the plastic boats.

Q. What was the draw of the wooden canoe that was on a trip with you?

A. That I don't know it exactly.

Q. What was the name of the gentleman who you said was such an expert canoeist?

A. It was George -- talking years ago. I don't recall his last name.

Q. Is he someone you met in --

A. Through the Scottsdale Sportsman's Club.

Q. Okay. And rather than repeating it, in terms of -- regardless which of the four canoes, you've never used any of them to haul lumber, to haul agricultural supplies, mining supplies, anything like that, correct?

A. No.

Q. Okay. You've used these four craft in the context of recreational experiences with friends, out on canoes, this is for personal enjoyment, correct?

A. I've used the canoes for pure recreation. I've used them to access exploration points. I've used them to hunt out of. I've used them to fish out of.

Q. Where have you hunted and fished?

A. Along the Gila, along the Verde. Pretty much the whole state.

Q. You made a comment towards the end of your discussion with Mr. Katz, and you were referring to Mr. Fuller's PowerPoints, and he had some slides where he had the little pictures of various craft at various flow rates?

A. I recall those.
Q. Okay. And is it your understanding that Mr. Fuller based where he put those crafts based upon some modern day recreational boating standards?
A. What was the question again?
Q. Is it your understanding that those slides and where those craft were placed relative to various flows was based upon modern day recreational boating standards?
A. I would assume that those were placed there on the capabilities of those various craft.
Q. Do you know whether he was evaluating modern day recreational boating standards or not in that context?
A. I don't know. I would say that he was probably looking at what the various craft are capable of.
Q. Did you speak with Mr. Fuller before testifying today?
A. Jon Fuller is a friend of mine.
Q. You mentioned that you think we're missing an opportunity for commercial navigation on the Gila River in its current state. What forms of commercial navigation do you think could be conducted on today's Gila River?

A. It could go from as simple as I have a hard time finding a local to drive my vehicle from the take-out to the put-in, which would be worth anywhere from a hundred to two hundred dollars into the local economy, to commercial outfitters being able to access these streams and turn dollars on the tourist trade.

Q. Commerce surrounding the recreational navigation?

A. Yeah, hotel, local hotels, restaurants, stores.

Q. You talked a little bit -- you were right up front about not being a historian and you're not trained in that regard and you didn't really give any opinions about historical, any historical aspects of this. But you did talk sort of vaguely about reading various things and various accounts, and it sort of supported your read of the Fuller PowerPoints. Is that a fair characterization of what you said earlier?

A. My acceptance of Mr. Fuller's PowerPoint is basically using my experience on the water and looking at what he put in his PowerPoint, and my comparisons have been very similar to what he presented.

Q. But in terms of the historical accounts that the various parties have looked at in these proceedings, that's outside of your knowledge and understanding,

correct?

A. For the most part, yes.

Q. And so if there was information that was relevant to these proceedings that was not contained in those PowerPoints, you're probably not in a position to identify that information?

A. I probably wouldn't be the guy.

Q. Okay. You talked a little bit about boating Gila Box, and you said that was a March activity for you, correct?

A. That's a good season for it, that's correct.

Q. That's because you've got the spring runoff and the flow is going to be higher than other time of the year?

A. When there's a good snowpack in New Mexico, it's generally a little bit better.

Q. And so you don't boat it in the summer because that's just the flow regime, it's going to be at lower water event?

A. I have friends who have boated it in the summertime. It would be a low water event, but I like low water. I've just never had the opportunity to get in there in the summertime.

Q. You talked about -- you were asked about the depths in Gila Box in your experience, and you talked

about, you talked about some shallow water associated with riffles, et cetera, and then you also talked about, I think 20-foot holes; did you say that?

A. Sure.

Q. Tell me about those 20-foot holes. Where do those reside on the streambed? If you're looking at it from a cross-sectional perspective, you're taking one point on the river, where do those holes reside?

A. The holes are generally where the river would change direction or where there's a tributary coming in that causes a riffle or a rapid, and at the base of that, the water is generally deeper.

Q. Are those deeper points always in the middle of the stream from a cross-sectional perspective?

A. They're generally stream wide.

Q. Stream wide. So you'll have a 20-foot hole that runs the length of the streambed from a cross-sectional perspective? The width, I should say.

A. It might taper in, but it tapers steeply to the bottom.

Q. I don't think you talked about the sort of median depth in Gila Box in your experience when you're boating in March. You talked about the shallow parts and you talked about these 20-foot holes, and those are the two extremes, right?

A. Right.
Q. What's the median depth in your experience when you're boating the Gila Box?
A. I would guess it to be four to five feet.
Q. Four to five feet in March. And remind me, I wrote down the 20-foot holes. What was the shallow depth that you've experienced?
A. In the Gila Box?
Q. Yes.
A. Down to two inches.
Q. You haven't boated Gila Box in extreme low water, but you said you do like low water boating; is that right?
A. That's correct.
Q. What are some streams or creeks on which you've done some low water boating?
A. The upper reach of the Verde is my favorite.
Q. What kind of depths are we talking about there when you're characterizing it as low water boating?
A. 26 CFS is base flow in the summertime on that section where boating in water that is in the riffles might be an inch, and the deepest parts might be four feet. That would be the reach approximately where the train to Perkinsville, the scenic railway is.
Q. And you've talked again about sort of the low

part and the high part. When you're doing this low water boating on the upper Verde, what's the sort of median depth you're talking about associated with 26 CFS?

A. I would guess it to be around a foot.

Q. Do you have experience boating any stream in Arizona where the general median depth on the day you're boating is less than a foot?

A. General median depth? You know, I really don't know.

Q. When you're -- I didn't get this, I don't think. What's the make and model of your 18-foot canoe?

A. It's again an Old Town Discovery. It's again a polyethylene boat.

Q. And I asked you this about Mad River. Mad River wasn't making plastic canoes back in 1912, and I assume the same is true of Old Town?

A. Old Town was manufacturing canoes, but they were made out of wood.

Q. No one, to your knowledge, was making plastic recreational canoes in 1912; is that right?

A. Not that I know of.

Q. When you're on a recreational expedition, maybe you're going camping that night, do you take GPS with you?

A. I've taken GPS with me.
Q. Is that common for you or is that just hit and miss?
A. It depends on what I'm doing. For instance, I do a lot of work with Audubon, National Audubon, and we do important bird area surveys, and they're point-specific surveys. So there will be a GPS on a trip like that. Most of the time I'm doing my navigating by USGS topo map.
Q. Have you ever boated the San Francisco?
A. No, I've not.
Q. I think the answer to this is no, but I just want to close the loop. Based upon -- you're talking really more about your experience in modern times. I just want to make sure that you don't have any information about the types of commercial activities, if any, that occurred on the Gila River at or before statehood; is that true?
A. It would have been anecdotal.
Q. What are those anecdotes?
A. Reading about some of the early expeditions, reading of accounts of the Spanish exploration.
Q. Father Kino, for instance?
A. Exactly. It's just anecdotal information.
Q. And Father Kino and the Spaniards never boated

the Gila; is that right?

A. Not that I know of.

Q. Okay. Do you have any anecdotes about use of the Gila River that are separate and apart from what you saw in Mr. Fuller's PowerPoints?

A. I don't.

Q. I think the question I asked you about whether you'd boated in a stream that had a general depth of less than a foot on that day, I think I restricted that to Arizona. Let me open it up to your boating experience more generally, Idaho, anywhere else. Do you have experience boating creeks or streams in less than a foot of water?

A. Yes.

Q. Where are those?

A. The one that I recall most vividly was a low water on the Gila Wilderness section in New Mexico.

Q. And what was the depth?

A. The flow was 50 CFS and it was running pretty much six inches.

Q. And which one of your canoes did you take on that trip?

A. I was in the Discovery, the 16-foot.

Q. So based on that experience, do you feel that any stream or creek that has six inches is good enough

for you to get up and down in a recreational boat?

A. I would boat -- I would without hesitation boat in less water than that in a canoe.

Q. And you would deem that to be navigable?

A. Yes.

Q. Okay. That's all I have. Thank you.

CHAIRMAN NOBLE: Thank you. We'll take a break at this point for 15 minutes.

(Recessed from 10:09 a.m. to 10:24 a.m.)

CHAIRMAN NOBLE: Mr. Sparks, please proceed.

MR. SPARKS: Thank you, Members of the Commission, Mr. Chairman.

CROSS-EXAMINATION

BY MR. SPARKS:

Q. Mr. Farmer, it's nice to meet you. Thank you for being here.

A. Likewise, sir.

Q. I'm an old boat builder from the Mississippi River. I used to be a young boat builder though at one time. And I just wanted to ask you a few questions about your watercraft.

Can you hear me all right?

A. I can, sir.

Q. I know I might be more easily understood if I

could speak faster, but this is as fast as you can do if English wasn't your first language -- and my first language was Reiki which is the dialect spoken, alleged to be English, on the Mississippi River where I grew up. So trying to make the conversion is difficult.

I just want to talk -- have you built any boats or canoes?

A. No, I've not.

Q. Are you familiar -- just generally, I like for the Commission to understand your view of how the canoe takes water or uses water. And I just want to talk about the parameters of the craft that you're talking about.

For instance, the length of the craft is one of the components in terms of -- in determining how much water it's going to take to float that boat, right?

A. Length is one, yes.

Q. And the width of the craft is another factor, correct?

A. That's correct.

Q. And the shape of the bottom is another one of the factors, correct?

A. That's correct.

Q. And then ultimately, the material out of which it's made is another factor; is that correct?

A. Could you explain what the shape -- is that in relation to how much water the boat would draw?

Q. Yes, at the moment I'm talking about that. I'll talk about maneuverability maybe separately.

A. Understanding the question, I would say that the material that the boat is made of really doesn't contribute to the buoyancy or the draft of the boat.

Q. So if the hull was made out of cast iron, that wouldn't make any difference from there to canvas over cedar?

A. Well, when you're getting into an extreme situation with weight, I would say yeah, you're correct with that. But the difference between wood and plastic, historic materials in regard to modern, commonly used materials to build them, I would say the weight of the materials is virtually indistinguishable.

Q. Now I would like to go to the stable of canoes or watercraft that you have. Do you call all the watercraft that you have canoes?

A. I own round rubber rafts that are rowed. I own cataraft which are rowed. I own canoes which are paddled. I have inflatable kayaks which are paddled and you sit on top, or scuppers which are plastic kayaks which are paddled. So I own a plethora of different type of craft.

Q. So do you have a number in the book where I could call to rent one of those?

A. You could rent one of mine, or I'd let you use it. Yeah, those are readily rentable.

Q. What's the nature -- did you say a round rubber raft?

A. That would be the type of boat that you would see that goes down the Grand Canyon. Not the big baloney boats, but a rowed raft.

Q. So it has a rounded bow and stern?

A. Sort of round. It's called a round boat because the tubes are round.

Q. Oh, I see.

A. It's shaped rather elliptical, if you will.

Q. And both the bow and the stern are under stress being inflated. The bow and the stern are both raised, correct?

A. They're raised by the shape of the material they're built out of, and they are inflated.

Q. I just now want to take you to the Gila River. You said that you traveled, went in one of your craft, I believe you said it was the 14-foot -- no, the 16?

A. Probably the 16.

Q. 16-foot craft from the Gila Wilderness down to where?

A. It would have been, we put in at Cliff Dwellings, which is above Silver City right as the three forks of the Gila come together, and we boated approximately 40 miles down to the small agricultural community of Bluff.

Q. And so Bluff is one of the Gila River gages, or do you know that?

A. There is a gage at Bluff right at Mogollon Creek.

Q. And what time of year was that then, spring?

A. March.

Q. March.

A. Which would be spring.

Q. And so the snowmelt in the Gila had started?

A. Yes.

Q. As you -- did you travel -- I'm sorry, I didn't catch this. But did you travel past Bluff or did you take out at Bluff?

A. I've never boated the section which would be the middle Box which is below Bluff to the state line. So yes, the answer is we took out at Mogollon Creek which is Bluff.

Q. And what was the reason you took out at that point?

A. That was the length of time that we could take

away from work to boat that reach.

Q. And the cubic feet per second on that day in the river by your testimony was 52 cubic feet per second?

A. I've done it multiple times. 52 was the lowest. It was a low snowpack year, and I've boated it up to 600 CFS on a higher snowpack year.

Q. And are there any major side canyons coming into the Gila in that particular stretch of water?

A. Nothing major. There's springs and small creeks and streams.

Q. Okay. And then between Cliff in New Mexico and after the Gila enters Arizona, what's the farthest point east in Arizona that you've put your canoe in?

A. At the Old Safford Bridge on Highway 181.

Q. And is that below Duncan?

A. Duncan is -- yes, it would be below Duncan. Duncan would be over in Reach 1.

Q. Okay. So you now are using the references of Reach 2 used by Mr. Fuller in his description?

A. Correct.

Q. And in Reach 2, at the Old Safford Bridge, how far downstream did you go?

A. I've gone down to the traditional take-out which is just above the irrigation diversion dam at the

head of Safford Valley.

Q. Now, is that the San Jose Irrigation Dam or the Brown Canal Irrigation Dam?

A. I'm not certain.

Q. When you get to that irrigation dam, whatever the name of it is, why do you take out there?

A. Actually, the formal take-out is below Bonita Creek at a public campground downstream of the Gila Box Wilderness, and that's the take-out because you can get a vehicle to the river and it just makes it easier. I've not boated all the way to the diversion dam.

Q. And what time of year did you float that one?

A. I've done it basically in the springtime, anywhere from March into April.

Q. What is the most recent time you've done that stretch?

A. Three years ago.

Q. Three?

A. Three years ago.

Q. So if my math is okay, is it 1911 or --

A. Okay.

Q. I mean 2011?

A. That's fine.

Q. Okay. And do you recall -- when you take out at Bonita Creek, did you observe any flow at Bonita

Creek?

A. Bonita Creek has always had a perennial flow in it.

Q. And how about, did you pass Eagle Creek?

A. I did pass Eagle Creek.

Q. And how was that doing?

A. The times I've been by it Eagle Creek has always had some flow in it, but it's been a minor tributary.

Q. And --

A. I've not seen it at flood.

Q. Pardon me. I'm sorry.

A. I have not seen it at flood.

Q. And how about San Francisco River?

A. San Francisco pumps a good bit of water in.

Q. At any one of those locations, did you experience rocks and pebbles built up in the stream where those three streams came into the Gila?

A. The San Francisco conversion, it's pretty much a gravel bar. No big hole, no big rapid. Bonita Creek is about the same. It's a gravel deposit, not rocky, and Bonita Creek was the rockiest of them all but still didn't make any significant change to the Gila.

Q. Thinking about the stretch of the river in there, it's roughly, roughly running from east to west;

is that --

A. I would say that's the case, yes.

Q. And all three of those streams are running from north to south into the river; is that right?

A. Pretty much so, yes.

Q. Where's the location of the material, gravel and rocks that are deposited in the river at those locations?

A. They're pretty -- it changes the stream-wide look of the Gila River where those come in, and the river never looks the same depending on the events that have happened in the recent past. Was there a flood event? There could be more debris until the main stem Gila flushes it downstream. So it's constantly changing. It's a dynamic river.

Q. And the dynamic part of that river, are the deposits typically piling the material up toward the south shore of the channel?

A. No. It's pretty much just, it changes, it slows the water down just upstream of the confluence, and then the velocity of the water increases as the water shallows and it goes over those deposits; and then downstream a short ways the river takes on its normal look.

Q. And then how far downstream did you go in

that, when you put in at the -- you said at the Old Safford Bridge?

A. Old Safford Bridge, yes.

Q. Yeah. How far downstream did you go?

A. To just below Bonita Creek.

Q. And so from Bonita Creek -- oh, when you took out on your trip through the Gila Box at the irrigation diversion, did you look at the river below the diversion dam?

A. You drive right across it to get back onto the highway going back to Safford, so yes, I've seen that river bottom.

Q. So you drive across the diversion dam?

A. No, you drive across the bridge about four miles downstream of the diversion dam.

Q. And what did the river look like where you crossed it on the river -- on the bridge?

A. Pretty low flow, pretty swampy in nature, not a lot of flow at that particular point.

Q. And then where you take out at Bonita Creek, can you observe any significant stretch of the river downstream from there?

A. Yes, you see the river continuing to flow on towards the diversion dam.

Q. And I represent -- my co-counsel, Julia

Kolsrud, and I represent the San Carlos Apache Tribe.

A. Uh-huh.

Q. And so I'm going to ask some question. If you want to take the Fifth Amendment about that, that's okay.

But I want to talk to you about -- you said you didn't put your boat in and go from, say, Thatcher or Safford down to Coolidge Dam on the Gila; is that right?

A. No, I've not.

Q. Okay. And so I think I understood you to say that you put your craft in, that you've floated the Gila River from the base of Coolidge Dam all the way to Kelvin?

A. It was not actually at the base of the dam. I couldn't see the dam from where we put in.

Q. Where did you put in?

A. It was below the dam. It was on, one time we put in we were lucky enough to be on an expedition and put in at the gate, down the lock gate.

Q. So on that occasion you did go in the gate and down the canyon road into the Gila --

A. Yes.

Q. -- below the dam? And then how far below the dam did you go that time?

A. We went to the park in the City of Winkelman.
Q. No, I mean, where did you put the boat in at that point? How far below the dam?
A. Oh, I couldn't see the dam, so I couldn't tell you how far down it was.
Q. And you rely, I believe Mr. Horton asked you, Commissioner Horton asked you how you determined the velocity of the water, and one of your references was to the gages on the river?
A. That's correct.
Q. And do you know what the gage on the river, on the Gila River just below Coolidge Dam was on, let's say, one of the events at the lowest flow?
A. The lowest I've boated that was down around the 60 CFS mark.
Q. So the 25 CFS wasn't one of your trips?
A. Not on the Gila.
Q. Okay. Around 60 CFS?
A. Yes.
Q. And you showed a recognition that the Coolidge Dam stores water, and therefore, the flow is limited to the releases from Coolidge Dam. That's your understanding, isn't it?
A. Yes, Coolidge Dam limits the releases, correct.

Q. And have you traveled as far downstream as Kelvin?
A. Yes, I have.
Q. So that was after the San Pedro came in?
A. Yes, it is.
Q. And I believe one of your testimony is that you've canoed that when the velocity of the water in cubic feet, the volume of the water was 700 cubic feet per second?
A. Yes.
Q. Or higher?
A. Yes.
Q. Are you aware of the limitations of the releases from Coolidge Dam?
A. I'm not.
Q. Do you know whether or not there's like a 437.5 cubic feet per second limit on the call?
A. I don't have any idea if there were any limits. I've seen it in the summertime flow when there's water, when the reservoir is at full pool where they can safely store at that level. We've had it go all the way to over 1,000 foot per cubic -- cubic foot per second in the summertime. Now, the things might have changed between now and a few years back. That I'm not aware of.

Q. When was the trip where you saw it at 1,000 cubic feet per second below the dam?

A. It was probably between eight and ten years ago.

Q. And I need to take you back up to Duncan. Where is the location you put in just below Duncan?

A. It would have been the Old Safford Bridge on Highway 181.

Q. Did you experience any geological condition on the river that would have restricted flow or brought the flow up to a higher level?

A. I don't understand the question.

Q. Yeah, I don't blame you.

Did you experience any of the river showing bedrock in the river where you were floating downstream?

A. I didn't notice bedrock in the stream bottom, but there's certainly bedrock in areas that come down into the water from the shoreline.

Q. When you're in the Box Canyon, Gila Box, how much shoreline is there on either side of the river compared to the canyon wall?

A. The Gila Box is really a misnomer. Normal box canyons you picture it with sheer cliffs that come right down to water's edge. The Gila Box has probably, the

floodplain is probably -- averages three-quarters of a mile to a mile wide, and then some areas are cliffed. Other areas are sloping, mountainous areas with ridges. But it's pretty wide down there. It's not really narrow in the Gila Box.

Q. I'm going to take you now back down below Coolidge Dam and just above Needle's Eye.

A. Uh-huh.

Q. What is your experience with the type of water and pool above Needle's Eye in the river, say the first half mile of Needle's Eye?

A. It seems to be meandering river in the fact that it's confined to the bottom of the canyon that it's in and it's twisting and turning. The streambed seems to be mostly of an alluvial type with very few rocks in it.

Q. And the velocity of the water in that location?

A. It would be similar to a moving sidewalk, depending on flow. The higher the flow, the faster it moves.

Q. Then once you get to the eye of the needle, upstream on the eye of the needle, what happens to the velocity?

A. The Needle's Eye is really a spectacular

place. I encourage you to visit it some day. It kind of slows down and pools up at the head up above the rapid, and then as it plunges over it, the velocity increases as it makes its way down through the rocks and the turns.

Q. Can you, from your experience, distinguish the rate of the volume of flow above versus while you're in the descent through the eye of the needle?

A. The flow above it might be somewhere around -- again depending on flow, higher flow would be higher velocity. Average flow, I would say you might be moving three or four miles an hour at the tops. As you're descending through the rapid, that might pick up to four or five miles per hour.

Q. Is there any meandering as you go through the eye of the needle?

A. The Needle's Eye rapid is sort of an S-turn rapid, and you're dodging rocks and things of such nature through that rapid. It's about maybe a little under a half mile long in its entirety.

Q. Have you ever used a canvas canoe?

A. No, I've not.

Q. What do you think --

A. Can I retract? I have boated in a boat that was advertised in Popular Mechanics in the '60s called a

Folbot, and it was a metal frame with kind of a vinyl canvas skin on it. I have had occasion.

Q. So you could also use that as a luggage rack on top of your car, right?

A. Or a suitcase, sure.

Q. That's the way it was advertised.

A. Uh-huh.

Q. What would you think would be the weaknesses, if any, of a canoe made out of canvas, and not the Folbot?

A. I've got firsthand conversation with two brothers who were paperhangers who built their own boat, and they tried to navigate the Verde River with it. It was wood frame with commercial vinyl wallcovering for the skin, and they ended up walking 20 miles out.

Q. Do you have any experience, anecdotal or otherwise -- see, that's one of the words I couldn't possibly say. I also can't say "tire iron."

But anyway, any other experience with canvas, in fact, just regular duck canvas?

A. Not in my experience, no.

Q. In your experience with boats, do you have any insight into the vulnerability of such a skin on a canoe?

A. I could not say.

MR. SPARKS: I think that's all I have, Mr. Chairman. Thank you.

CHAIRMAN NOBLE: Thank you very much, Mr. Sparks.

MR. SPARKS: Thank you for your time.

CHAIRMAN NOBLE: Is there someone else who would like --

MR. SPARKS: Oh, may I? I have two more here.

CHAIRMAN NOBLE: Yes, you may.

MR. SPARKS: Sorry.

BY MR. SPARKS:

Q. There are a couple of things that you said about the Verde that were intriguing to me. The first one was, I thought you said that you canoed the Verde from its beginning, and then I don't know where you stopped.

A. Generally, the take-out that we have used is Clarkdale, Arizona.

Q. Okay. Where did you put in, where did you put in into the Verde River?

A. We put in at -- I'm not certain of the name of the ranch, but there's a ranch on the river left that's on the river, left side as you're looking downstream. It was the Three something Ranch. We had permission to cross the private land and put in there, and we boated

down to Perkinsville on that trip.

Q. And did you experience the canal that comes off of the Verde River up in that location?

A. There's a diversion in Perkinsville and there's a diversion in just above Clarkdale.

Q. And did you take the diversion route through Perkinsville or down from Perkinsville?

A. No, there's actually an active beaver dam at that diversion, and we stayed in the river. At the time we went down, the water was not being diverted to the field. It was going down the spillway of the beaver dam.

Q. Do you know, because there's a beaver dam there, there's probably also less water flowing into that diversion?

A. I think the beaver dam basically enhanced the regular irrigation diversion dam. But for some reason, there was no head on the diversion ditch. I think it was downstream. They didn't need the irrigation at that time.

Q. And then farther upstream on the Verde you didn't go or you haven't gone?

A. The Verde traditionally headwaters at Sullivan Lake, and that has been dewatered in recent years due to excessive groundwater pumping. I've not -- I've walked

down where Granite Creek enters it and down into the spring where the Verde starts with about 22 CFS. No, I've not boated that very upper reach.

Q. So from Sullivan Lake, you haven't, that's in the Chino Valley, right?

A. Right, right at the end on the eastern edge of Chino Valley.

Q. And you haven't boated that part?

A. No.

Q. And then where is the Sycamore Canyon compared to where you put in on your trip?

A. Could you refer me to which Sycamore Canyon out of the three --

Q. Well, Arizona has only one Sycamore Canyon. I'm really sure of it.

A. No, sir, the Verde has three. The only thing they have in common is they enter from river left as you're looking downstream.

Q. Well, you know I was only spoofing you because we've already talked about several. But anyway, the Sycamore Canyon, that basically is another wilderness area.

A. Okay. The Sycamore Canyon that flows downstream from Flagstaff into the Verde?

Q. Yes.

A. Okay.
Q. Did you put in below Sycamore Canyon?
A. No, we've always boated past Sycamore Canyon.
Q. And where Sycamore Canyon comes in, is there rocks and boulders piled up there after storms, or do you know?
A. Not at Sycamore Canyon. Sycamore Canyon is a rocky creek run, and at flash, it has potential to flash a lot of rock out in the river. But that hasn't been the case in the last few years.
Q. Okay. The other headwaters of the Verde that I --
MS. HERNBRODE: Mr. Sparks, I can assure you if you don't scare him off too much, Mr. Sparks, you will get a chance to question Mr. Farmer on the Verde as well. So I don't -- I'm not stopping you. I just wanted to make you aware.
MR. SPARKS: Well, since he brought up the Verde here, I'm going to ask him questions about the Verde.
MS. HERNBRODE: All right. That's fine. That's fine.
MR. SPARKS: It's about boating.
BY MR. SPARKS:
Q. The other headwaters of the Verde is the upper

East Verde. Have you canoed that?

A. The East Verde is a tributary downstream of the Verde. It has up to Class V water in it. I've hiked extensively on the East Verde. I've never had the opportunity to boat it.

MR. SPARKS: That will do it. Thank you.

CHAIRMAN NOBLE: Thank you, again, Mr. Sparks.

Who is going to go next? I see Mr. Helm looking, Mr. Murphy looking. I see Mr. McGinnis getting a little nervous.

MR. McGINNIS: I'll let Tom go ahead. I'm just nice.

CHAIRMAN NOBLE: Mr. Murphy, please proceed.

CROSS-EXAMINATION

BY MR. MURPHY:

Q. Good morning, Mr. Farmer. My name is Tom Murphy, and I'm an attorney for the Gila River Indian Community.

A. Pleasure.

Q. How is it that you came to be a witness in this proceeding?

A. I've been familiar with the goings-on on this. There was a round where a dear friend of mine sat in the seat where I'm sitting right now, and he became unable

to continue that. So I was drafted to take it on.

Q. Was this through a particular group or just individual friendship?

A. I'm not a member of any recreational boating club at present.

Q. Okay. You're not engaged in any commercial business related to your boating, right?

A. No, sir.

Q. And for you boating is purely recreational activity?

A. I hunt and I fish and I boat for recreation.

Q. And as recreational activity, you do this when it's convenient for you, right?

A. Sometimes when the water is up, I'll make it convenient for myself.

Q. That's my next question which is when it comes to boating, you want your trip to be successful, right?

A. Yeah, generally that's the desired outcome, correct.

Q. So you want to pick a time of year when there's water in the river, right?

A. Well, okay, I'll go with that for the moment.

Q. Well, let me ask you this. Before you go on a trip, do you check anything online?

A. I'm always online checking, checking river flow, but if you said that you had a permit to go on Grand Canyon tomorrow, I would not really say river flow would be the limiting parameter of that.

Q. What about for boating on the Gila? Would you typically check USGS flows before you went?

A. Yes.

Q. And when you were answering Mr. Katz's questions, when you were talking about the CFS, was that based upon what you saw in the USGS before you went on those particular trips?

A. Could you rephrase it a little bit?

Q. Well, sure. You were giving estimates of the CFS --

A. Uh-huh.

Q. -- on various segments of the river?

A. Uh-huh.

Q. You're not stopping during your boating trip and measuring the CFS?

A. I know people that do, but I'm not that.

Q. And so is that based on your eyeballing the river, or is that based on what you see online through USGS before you go?

A. Well, there's some places that have no gages, so you're pretty much going on rainfall and Kentucky

windage and that kind of thing. But the gages are very helpful.

Q. With regard to the Gila River, you've never boated upstream, have you?

A. I've boated upstream but for short distances.

Q. Like from where to where?

A. It would be, oh, my God, we missed the camp. We need to go back up a half a mile.

Q. I was looking at pictures online, and I think it might have been Needle's Eye, and I saw folks in boats wearing helmets. Do you ever do that?

A. I own helmets.

Q. Why would you wear a helmet when you're boating?

A. The boater slang is it's what's known as a brain bucket. It's similar to riding a motorcycle. Either you choose to wear a helmet or you choose not to.

Q. Why would you choose to wear a helmet?

A. Well, to avoid serious injury.

Q. What would be the possible causes of serious injury?

A. Impact with your head on some hard object.

Q. A rock?

A. A rock could do it. A paddle could do it.

Q. Now, you were asked some general questions about Mr. Fuller's PowerPoint presentations. You weren't here yesterday or Monday when Mr. Fuller was testifying, were you?

A. No, I was not.

Q. And with regard to the work that he presented in the PowerPoints, I mean, you didn't go -- and I want to say -- check his work, did you?

A. I would have no reason to, no.

Q. Now, you mentioned on questioning about maybe anecdotal reading of prehistoric natives. Do you recall which natives those were?

A. It would have been the Hohokam; it would have been Sinagua; it would have been the Anasazi. Just the normal prehistoric peoples that inhabited the desert southwest.

Q. What accounts are you aware of of any Hohokam utilizing boats on the Gila River?

A. I'm not.

Q. Okay. Now, the canoe that you choose to use the most is made out of material that wasn't available prior to Arizona statehood; would you agree with that?

A. That's correct.

Q. So we know the materials are different in the canoes now. Are the manufacturing processes used to

make canoes different now than they were before statehood?

A. There's people constructing historic replicas today that use the same tools and build them by hand, the same as they were built prior to statehood. Modern materials use different manufacturing techniques completely.

Q. And even a modern canoe made out of wood manufactured today, the actual manufacturing process for putting that together is likely different than it was in 1912, right?

A. According to the periodicals that I reviewed, there are men and women who take great pains to use time-appropriate tools, time-appropriate woods, time-appropriate materials to replicate them exactly.

Q. Sure. That's not what a commercial canoe manufacturing company is going to do, right?

A. I don't -- I can't speak to that. I don't know their process.

Q. Now, Segment 1, you talked about driving from New Mexico over -- along Segment 1 back into Arizona, right?

A. Both ways, yes.

Q. Are you familiar with an area called Cosper's Crossing?

A. No, I'm not.
Q. When you're driving along, I think it's Highway 75, and the river is there on your left if you're coming back from New Mexico. I mean, there's a fair amount of time when that portion of the river is dry, right?
A. I don't know.
Q. Did you discuss this with Mr. Sparks, the flows that are created in Segment -- I think it's 4 which is Needle's Eye -- is that 4 or 5? 4. Those flows are created by the Coolidge Dam releases, right?
A. They're not created by it. They're controlled by it, yes.
Q. Well, if there were no releases from the dam, there would be no flow, right?
A. If there were no dam, there would be flow.
Q. Let's talk about that. I'm not sure why that's funny. But if there wasn't a dam, the flows might not be as consistent as they are now, right?
A. The flow would be dependent on rainfall and snowmelt, correct.
Q. And one reason why that dam is there is to create more consistent flows at various times, right?
A. That flow's exclusive reason is for that purpose.

Q. You talked about one of your canoes handling water two inches deep. How do you paddle in two inches of water?

A. It's easy. I'm in a moving river. The river provides the velocity. I'm just using the paddle to control the boat and keep it where it needs to be in the current.

Q. So you're just relying on the current?

A. When I'm traveling downstream in the river, that's correct.

Q. What if the current is not sufficient, what do you do?

A. Paddle.

Q. In two inches of water?

A. Sure.

Q. You're paddling water or water and sand?

A. Everything is fair.

MR. MURPHY: I think that's all I have.

CHAIRMAN NOBLE: Thank you very much.

Mr. McGinnis?

CROSS-EXAMINATION

BY MR. McGINNIS:

Q. Mark McGinnis on behalf of the Salt River Project, Mr. Farmer.

A. Hi.
Q. The good thing about going last is I don't have very many questions. The bad thing is I'm going to skip all around a bunch of different places.
A. Let me say thank you for the clean water you allow me to drink everyday.
Q. You're welcome.
How is it you came to be here to testify today?
A. I was asked if I had any interest in helping with the navigability efforts that are going on.
Q. Who asked you?
A. You know, that's kind of -- I think the crew here pretty much asked me.
Q. You said you knew Mr. Fuller previously, right?
A. Yes, I've known Jon for a number of years.
Q. How long have you known him?
A. Oh, I would say within ten years.
Q. What's your association with him?
A. Boaters.
Q. Have you been on boat trips with Mr. Fuller?
A. Yes.
Q. Have you been on recent boat trips with Mr. Fuller?

A. Yes, one earlier this season.
Q. I'm not sure I understood your testimony when Mr. Katz was asking about whether you had boated on Segment 7. Have you boated on Segment 7?
A. I have not.
Q. You said you were working on constructing a reed boat made out of materials you found along the river?
A. Correct.
Q. Which river was that?
A. Would have been the Verde.
Q. And how far along are you in that process?
A. It's about halfway finished.
Q. How much time have you spent on it?
A. Oh, probably, without the driving time, probably five, six hours.
Q. And when did you start working on that?
A. Oh, last autumn.
Q. Why did you decide to do that?
A. Just to see if it could be done.
Q. And so far you haven't been able to do it?
A. No, I've not proven anything with it.
Q. You talked some about the draw or the draft of your different canoes. Do you recall that testimony?
A. Yes.

Q. If you said that your canoe has a draw of three inches, for example, does that mean that the canoe, the bottom of the canoe never goes below more than three inches below the top of the water?

A. I would say generally that would be the assumption.

Q. So if you go over a beaver dam like you said you talked about, and then you land in the water --

A. Uh-huh.

Q. -- on the other side of the beaver dam, the bottom of the boat still stays within three inches of the top of the water?

A. The bottom of the boat is going to scrape over the top of the beaver dam. The front of the boat is probably going to hit the bottom on the reentry. The back of the boat is probably going to drag the beaver dam all the way down.

Q. So the bottom of the boat would actually go more than three inches below the water, at least at one point?

A. Sure.

Q. So just because it has a three-inch draw doesn't mean it never goes more than three inches below the top of the water?

A. I think you've got that exactly right.

Q. And depending what the event is that's causing that, it could be different amount, more than three inches below the water, right?

A. I've had the whole boat under water before, yeah, you're right.

Q. If you go over a waterfall and you end on the other side of the waterfall, you could go pretty far down into the water, right?

A. You could go all the way to the bottom, right.

Q. You talked some about the potential for recreational and commercial activities on the Gila. Do you recall that testimony during --

A. Yes, sir.

Q. -- your direct? You need to let me finish and I need to let you finish, okay? Or otherwise the court reporter going to get real upset with us, okay?

You recall that testimony during your direct?

A. One more time?

Q. Okay. You talked some during your direct about potential for recreational and commercial activities on the Gila River?

A. Yes.

Q. You recall that?

A. Yes, I do.

Q. Why is it that you think that those potential

activities aren't already occurring?

A. Oh, I'm sure they do, are occurring somewhat. Like if I need a shuttle driver, I'll look around through the local phone book and see if I can find somebody or word of mouth. I don't hear of a lot of outfitters that are -- on the other hand, I don't hear of a lot of outfitters who are offering services, advertising services for expedition boating or shuttle services.

Q. But you think there is additional untapped potential for commercial activities on the Gila River, right?

A. Yes.

Q. And I think you already mentioned that there are a lot of folks in rural areas that are underemployed?

A. I would assume that, yes.

Q. So those people would have incentive to undertake those commercial activities, wouldn't they?

A. You would hope.

Q. And that hasn't happened, in your opinion?

A. It's happened in the past, but I don't think it's happening at the potential that it could be.

Q. You talked about owning some inflatables and some rubber rafts, right?

A. Yes.
Q. Have you used any of those on the Gila River?
A. Not on the Gila.
Q. Why not?
A. Never needed to. The canoe's always been adequate. Let me take that back. We did a 14-foot raft and a cataraft down the Gila Box section on one occasion.
Q. How long ago was that?
A. It would have been three years, if the previous testimony was correct, it would have been 2011.
Q. The last series of questions I have, I want to talk to you about what you do on a typical trip, say to the Gila Box.
A. Uh-huh.
Q. And if I ask you a question and you can't describe it in terms of a typical trip, it depends on the trip, please let me know. Okay?
A. Okay.
Q. So you're going to boat on the Gila Box. It sounds like before you do that, you get on your computer and look on the Internet about what the flows are, right?
A. What the potential flows are, correct.
Q. Do you ever also use your computer to get on

the Internet to look at the weather forecast?
A. Always.
Q. Anything else you use a computer for before you go?
A. Oh, not really.
Q. So you decide to go on a given day. How do you get from your home in Phoenix to the Gila Box?
A. A motorized vehicle.
Q. What type of vehicle do you typically --
A. A pickup truck, generally.
Q. Is your boat in a trailer or is it in the truck?
A. It depends.
Q. Do you own a trailer for your canoes?
A. I own trailers for my business. I don't own a trailer specifically for my canoes, no.
Q. So to get there you use either a truck or a truck and a trailer?
A. Yes.
Q. What type of gear do you take along with you on a typical day trip to the Gila Box?
A. Day trip, you'd take lunch. You'd take water. You might take ice, depending on the time of year, ice chest. That would be a day trip.
Q. You said sometimes you use a GPS?

A. Very -- I don't use one very much at all.
Q. You take a cell phone with you?
A. Generally the cell phone is down in a waterproof container, yes.
Q. Any other electronic equipment that you take with you for the trip?
A. No.
Q. You talked about the waterproof container and you testified some about that earlier. What kind of waterproof containers do you have for your gear?
A. I have everything from roll-up rubber dry bags to military surplus ammo cans.
Q. What are those made out of?
A. Steel.
Q. How about the roll-up dry bags, what are those made --
A. They're made out of various materials, neoprene, different, different reinforced rubber products.
Q. You said at one point you had some sort of boat repair kit you take?
A. Yes, every boat I own has a repair kit.
Q. And what's in that?
A. The materials to fix the boat if it is damaged.

Q. Is that a kit you purchased somewhere?
A. Generally you purchase a basic kit and then you add to it.
Q. Any other accessories you take along with you?
A. Usually, you know, you have wilderness ethics materials like a groover, a fire pan, tent, just basically camping equipment.
Q. How about clothing, what kind of clothing do you normally wear on those trips?
A. It depends on the time of year. We go from everything from full dry suits and fleece down to sandals and shorts.
Q. What does a full dry suit consist of?
A. A full dry suit is generally made out of a Gor-Tex material and it's waterproof. It has waterproof cuffs, neoprene cuffs. Keeps you dry.
Q. How about footwear?
A. Footwear is generally, depending on the time of year, it could be fleece. It could be synthetic socks. It could be neoprene. Shoes, they could be sandals.
Q. When you take your inflatables on the trips you have done in inflatables, do you have to take some kind of pump?

A. Yes.
Q. Okay. What kind of pump do you typically use?
A. I own probably five or six different types of pumps. Some are low capacity. Some are high capacity. It depends on the trip. Most of the time it's just a low-capacity pump for emergencies.
Q. Are those battery-operated, or do you need some sort of --
A. No. No.
Q. Do you need some sort of generator?
A. No.
Q. Do you take any sort of first-aid kit along with you?
A. Generally, yes.
Q. And what's involved with that?
A. If you're boating the Grand Canyon, you have to have a major first-aid kit, along with every boat has to have a minor first-aid kit. We generally take somewhere in between on our boating excursions.
Q. Obviously, if you're going from one place on the river to another place, you have some issues with your vehicle, correct?
A. Yes.
Q. How do you typically handle that?

A. Usually I like to find somebody who lives in the area who is willing to drive my truck to the put-in. We unload. They take their truck, store it, and then pick us up at the take-out.

Q. It sounds like most of your trips are private, not involved with commercial outfitters?

A. I've never been on a commercial trip.

MR. McGINNIS: Thank you. That's all I have.

CHAIRMAN NOBLE: Thank you, Mr. McGinnis.

MR. KATZ: I have just a few more, if there isn't any further cross.

CHAIRMAN NOBLE: Mr. Katz, please begin.

REDIRECT EXAMINATION

BY MR. KATZ:

Q. You were asked a while ago about whether or not you had ever transported any lumber, mining supplies, agricultural supplies, or other goods down the segments of the Gila River that you've boated, correct?

A. That's correct.

Q. And you haven't taken those types of supplies, correct?

A. I have not.

Q. But there's no reason that if someone wanted to transport lumber -- if it could fit inside the hull

of a canoe -- mining supplies and agricultural supplies in one of your boats if they want, or a boat similar to yours if they had wanted to do so?

A. Sure, you could.

Q. And it doesn't matter, again as we talked earlier, whether or not you're transporting camping supplies, food, lumber, mining supplies, ag supplies, you can load that boat to capacity, whatever it might be, and not have a significant effect upon the draw of the boat or the depth that it would sink, so to speak, into the river?

A. That's correct.

Q. And you've indicated that draw of a wooden canoe is similar to that of a plastic canoe?

A. Yes, it is.

Q. And the weights of the canoes made of those materials are substantially the same?

A. I would say that a wooden canoe would trend a little heavier than a plastic canoe, a modern plastic canoe.

Q. But if it had the same hull design as a modern plastic canoe, would you expect the draw to be significantly different?

A. I don't think the weight ratio would change the draft of the boat significantly at all.

Q. And in addition to being able to transport mining supplies and other types of goods, could you transport a thousand pounds in your -- is it your 16 or 18-foot boat, of furs, if that was your choice to do?

A. It wouldn't matter what the material was. The weight is the weight.

Q. Based upon your experience in boating the Gila River and the different segments that you described, do you have a pretty good idea, based upon your understanding and experience on the river, of what expected flows and depths would be at various times of the year?

A. I'm sorry. I spaced that one. Could you repeat it?

Q. Okay. Based upon your boating experience on the Gila River, do you have a pretty good idea or understanding of what expected flows and depths of the river would be at any given time of the year?

A. As an average, you could make reasonable expectations of what it would be.

Q. And again, I think you already told us, but you have boated in flows with a depth of a foot or less at various portions of the Gila River, correct?

A. That's correct.

Q. I just wanted to show you a quick slide,

number 112 -- and I don't think we need to pull it up -- from Mr. Fuller's boating presentation.

MS. HERNBRODE: I got it.

BY MR. KATZ:

Q. Oh. And we're looking at modern recreational boats. What we're looking at on the left, an inflatable boat that was built at or about 1855 and a modern boat.

Does your inflatable boat resemble either of these two in terms of its design or appearance?

A. On the boats on the left or the boat on the right? Or both?

Q. Both. Just compare each.

A. Well, the Avon Redshank, the modern boat, is like a 1960's era tender. It's a self-baler. It's really not a river boat. The oarlocks are totally insufficient. So I think that's not a good replica of a modern whitewater river raft design. But I did own a Redshank, and I've taken it down numerous rivers successfully. So I guess the answer is yes.

Q. And getting away from that, I don't have any other questions about that slide 112 in the boating presentation. But Mr. Sparks asked you about gravel that occurs at the confluence of the San Francisco and Gila Rivers, correct?

A. Correct.

Q. And could you describe that situation or circumstance a little bit better for us?

A. What are you --

Q. When we're talking about gravel, are we talking about large rocks?

A. No, but you're talking river run could be rock from about a half inch screen size to three or four inches screen size.

Q. And when you boated the area at or near the confluence of the San Francisco and Gila Rivers, has your boat bottomed out into the gravel?

A. No.

Q. And what were the normal flow depths at or near that location, if you can recall on your various trips?

A. The area immediately above the confluence was -- it slowed as it came into the shallower water and it sort of backed up, so the velocity was such that it was slower. As you hit the area of the confluence, the gradient increased and the velocity increased as it ran down the riffle, and at the bottom of the riffle, which at the San Francisco it's maybe a hundred yard, the riffle is a hundred yards or less. At the bottom of the riffle, the depth of the river came back.

Q. And again, you're not bottoming out even in a

fully-loaded canoe?

A. I don't recall hitting one time.

Q. And what about Bonita Creek's confluence with the Gila River?

A. Bonita Creek is -- it has an upstream diversion, and it very seldom runs much. So it's really a nonissue.

Q. So Bonita Creek, it's your understanding, is being diverted for agricultural purposes?

A. Some sort of a transfer into Black River.

Q. And what about the San Francisco, do you have any knowledge as to whether or not it is diverted or its flow is diminished --

A. I would assume that the San Francisco is diverted in New Mexico possibly and its reaches in Arizona, but it still has current as it hits the Gila.

Q. You were basically asked to -- I think you've indicated that the Gila River is a dynamic river, correct?

A. Correct.

Q. And it's dynamic in part because of seasonal changes such as precipitation or dry seasons?

A. That's correct.

Q. But it is also dynamic, at least in part, because of damming and diversion which alter the normal

flow of the river, correct?

A. Those do impart change on it, that's correct.

Q. And when we talk about the river being dynamic, that doesn't mean that it's erratic for boating purposes within the primary or flow channel, does it?

A. No. It doesn't.

Q. But the surrounding floodplain might vary depending on floods, droughts, vegetation changes?

A. It would, yes.

Q. And when you talk about the dam controls the flow of the water, it does so for agricultural purposes without much concern about boaters that might wish to or are using the river, correct?

A. I would say that the agricultural demand trumps everything else.

Q. And also possibly the demand for drinking water or other individual uses other than boating the river?

A. One could assume.

Q. And you mentioned -- we'll add a little bit of -- we'll try to flush things out a little bit. But what is a groover?

A. It's a depository for human waste.

Q. Okay. A portable toilet, so to speak?

A. Very portable.

Q. I have one more question I'm going to ask but I just was asking my colleagues if I had a senior moment that I needed to have refreshed.

But if I take you back to 1912 and have you in your boat, but it's made out of wood rather than plastic, do you think that you would have had any greater difficulty navigating Segments 1 through 8, or 1 through 5 of the river than you currently have?

A. Man, I could only wish for that. I think I could boat all the way to Yuma.

Q. And whether or not there was usage of boats, you can navigate certain segments of that river today with substantially diminished flows, correct?

A. Correct.

Q. And if we added all that water back in so there was no damming and diversion or no damming and diversion that significantly altered the flow of the river in 1912, would you have any problems taking a boat down that river, even if you had chosen not to do so?

A. I don't see where you could have had any problem with it.

Q. So even if there weren't historic accounts or significant historic accounts of boating down the Gila River prior to statehood, do you have any doubt that you could have done it most of the year through each and

every one of the eight segments?

A. I not only have no doubt that you could have done it, I have no doubt that prehistorics did do some river travel on that reach.

Q. Thank you very much.

CHAIRMAN NOBLE: Anyone else have questions for Mr. Farmer?

Thank you very much, Mr. Farmer, for being here today. We appreciate the information that you've given us.

THE WITNESS: Thank you, Mr. Chairman. Thank you, Board.

CHAIRMAN NOBLE: Mr. Fuller, are you prepared to be reexamined by Mr. Sparks?

MR. FULLER: If I must.

MR. SPARKS: Can we have a short break here?

CHAIRMAN NOBLE: Sure, we can have a short break. Boy, I'm glad you asked.

(Recessed from 11:22 a.m. to 11:31 a.m.)

CHAIRMAN NOBLE: Mr. Sparks.

MR. SPARKS: Thank you, Mr. Chairman.

CHAIRMAN NOBLE: Before you jump in, please be advised that we will break for lunch in about 15 minutes.

MR. SPARKS: Okay. Thank you.

JONATHAN EDWARD FULLER,

called as a witness on behalf of the State Land Department, was examined and testified as follows:

CROSS-EXAMINATION

BY MR. SPARKS:

Q. Good morning, Mr. Fuller. My name is Joe Sparks, and with me is co-counsel Julia Kolsrud of our firm, and we represent the San Carlos Apache Tribe, and in some instances it's referred to as the Apache Threat. I don't mean to be threatening, because I'm not. But in the historical literature, sometimes it's referred to that.

One of the things I wanted to clear up is I apologize to you for yesterday because I handed you an exhibit that I was trying to get through before the time bell rang, and it was a document that looked like this on the front, and I gave you sort of an expanded version of it so you could actually see it. And there's a couple of things that I felt like, a number of things that I said and asked questions that were not sufficiently courteous to you in the way I went about it. I'm using the excuse as the press of time. But in any event, there's a couple things, one of which is this document isn't your document, is it?

A. It is not.
Q. And if you look at the document, it refers to whitewater boating rivers; is that correct?
A. It is correct.
Q. So it doesn't necessarily refer to boating on river conditions that are not in the whitewater condition; is that correct?
A. It may not. I'm not familiar with this document.
Q. So it doesn't -- it does not seem to purport to represent river conditions in boating at any other time of the year on the Gila River except for spring. Do you agree with that?
A. Are you saying that the document says that it's only looking at boating during spring, or you're saying that this document says you can only boat during spring?
Q. No, what I'm trying to point out is it doesn't say that -- it doesn't say when you can boat at all. It just says, on that expanded sheet that I gave you, it indicates that spring is the period of time on the Gila River on all four segments when whitewater would be available for whitewater boating and kayak would be the kind of boat you would use at that time.
A. I see the season part that you're talking

about. I don't see the kayak part.

Q. That's partway down at the bottom of the page where it has, on the left side has types of boat?

A. Small craft-kayak, et cetera? I do see that line right there. Until you provided this to me yesterday, I had never seen this. I don't know what the context of the document is. I haven't read it in any more detail than looking at this.

Q. And I realize that and that's one of the things I felt like was not fair to you. And what I wanted to point out to the Commission is that it doesn't purport to say when or how boating could occur on the Gila River by any other means. Do you agree with that?

A. Like I say, I'm unfamiliar with this document.

Q. Okay.

A. And if you say that's what it says, I have no basis to disagree or agree with that.

Q. I wanted to clarify with that.

MR. KATZ: Sorry to interrupt, but do we know what exhibit number this might be?

MR. BREEDLOVE: X023.

MR. KATZ: Thank you.

BY MR. SPARKS:

Q. Another one of the things I wanted to talk to

you about is I think you mentioned -- I need to understand a little, a lot better the part that you played in the production of the report for the navigability of the Gila, and unfortunately, I only have the draft final report. I don't know why we would have a draft final instead of a final, but that's what I have.

But one of the things you said during your testimony was that when I asked what additional evidence you had, the State Land Department, and I used the pronoun "you," but I meant the State Land Department, offered up to the Commission in this report as additional evidence on the navigability of the segments of the Gila River; and your response was, well, we did an extensive research into the other kinds of historical references to the river. Do you recall that?

A. More or less, yes.

Q. Counting on the more part than the less part that, I think you said, were contemporary journals of prior to and around the time of statehood. Is that fair?

A. I only recall talking about newspaper articles.

Q. In terms of the newspaper articles, are you the one that did the research into the newspaper

articles?

A. Yes.

Q. Do you consider a newspaper article a primary source for purposes of historical writing?

A. In this case, I considered it one of the few sources of historical writing regarding boating accounts in Arizona.

Q. But in terms of a primary source, the writer of the article would not be the observer of the event in normal circumstances?

A. In some cases, that's true. In other cases, not.

Q. In the cases of newspaper articles that you offered for evidence, do you recall of any newspaper article where the writer of the newspaper article was the observer?

A. Would you like to go through each of the accounts and look at that?

Q. I'm sorry?

A. Would you like to go through each of the accounts and look at that?

Q. I'm just asking if you recall anywhere the author was the primary observer?

A. I think in order to answer that question I need to page through the accounts for the Gila River.

Q. I'm sorry, I could not hear you.
A. In order to answer that question correctly, I believe I need to page through the accounts from the Gila River.
Q. Okay. Because of the time right now, I think we're going to go on from that but we may take you up on it after lunch.
A. My guess is that most of the newspaper articles were written by newspapermen as opposed to the boater, if that's what you mean by the observer.
Q. Well, by primary source, I mean the person who -- I mean the person who actually experienced whatever it was that was reported by the newspaper.
A. So, for example, there was a newspaper account in the Yuma area where they had formerly logs were being floated down the river, and now they had put in this boom to collect those logs.
Q. Yes.
A. In your mind, the observer in that case would be the log rather than the person who is -- the reporter who might have seen that happen?
Q. No, that's a little bit too direct. Logs do talk, but you have to be drinking enough tequila to understand them.
So I'm just speaking now of, let's say, a

human reporter of that experience of snagging the logs with the boom.

A. So the reporter may have seen that boom in action and reported on that, you would consider that to be an observer.

Q. But in that case, do you know whether the reporter saw it?

A. No.

Q. In terms of other reports, for instance, I know you don't want to hear about the Patties anymore. But the Pattie report, you said you didn't read that, right?

A. Not in its entirety, no. The diary, you're speaking of, right?

Q. The diary, yeah. Do you recall when the diary was written?

A. Not the specific date, no.

Q. Do you recall the date or the year in which Pattie was claiming to have reported that trip, the trip that he took with his son?

A. Yeah, the diary is in evidence and it had the date on it, so I'm sorry, I just don't recall the specific dates. I recall that the trappers were here in the 1820s, in that time frame, so --

Q. And the reference that's later in the report

that attributes to Pattie a statement that he floated from Safford down to Yuma on several occasions, do you know what the date of that report was?

A. No, I do not.

Q. Do you know when Pattie was in Arizona territory and when he left, or if he ever did?

A. It was in the 1820s as I just answered.

Q. In the what?

A. In the 1820s.

Q. So you think he was here in the 1820s and left in the 1820s?

A. Yeah, it's in the report, and the exact dates escape me at this moment. They're in the record. I could look them up. If you're really concerned about the exact dates, I'll take the time and dig that out.

Q. All right. And then in terms of the other historical documentary references that are made, did you follow-up to determine if the reporter who was obviously not the party who observed the activity, did you follow-up to see what kind of corroboration the reporter used for the information in the newspaper report?

A. I'm thinking most of the reporters are long deceased, so checking anything with them seems like a difficult task. In the accounts that we saw, we saw no subsequent documents that discuss their corroboration.

I assume that they used normal reporting practices.

Q. Yeah, I think you may have interpreted that a little bit more broadly. I was there, I mean, in 1825, but there aren't that many people in the room who were. But I was also there when Noah built his ark. That's the reason I said I was an old boat builder.

But by corroboration, I meant that the newspaper report referenced the corroborating sources for the information in the report.

A. Some of the reports they include quotes from the boater. In other reports they do not. It's stated as a fact or as an account, it says so-and-so did this. And that's how it's presented.

Q. Now, I want to take you to the tests that we're using in terms of navigability, and I believe that yesterday we came to understand that you use the definition of navigability and Daniel Ball, but otherwise, you were not familiar with the facts of the case, and that's a fair statement, isn't it?

A. My testimony yesterday was that I didn't, as I sat here, recall the details of that test. I've read it in the past. What I retained from that was this definition of navigability that has since been incorporated into the Arizona legislation and we've been using as a guideline. Other specifics of the case have

escaped my mind; some other facts have replaced them in my short-term memory.

Q. Do you have your slide available up there so that you can pull up slides that you've referenced yesterday?

A. Yes.

Q. I had a hard time making the transition from the material that I had worked with to the ones you used in your testimony here. But I'll do the best I can.

In the introduction, which is Page 5 of this document right here, I think it would be?

A. The boating presentation you're asking me about?

Q. Well, let's see.

A. It says on the cover there. Boating in Arizona.

Q. I'm visually challenged, so it may be repeated there.

A. Now you're looking at the Gila River presentation.

Q. Okay. Can you see what I've written on the back side of my tie here in terms of the label?

A. Yeah, you mentioned that you were trying to be brief today.

Q. Okay. There you go. Thank you.

Would you mind going to the part that refers to navigability, and just at the beginning on page, a page that doesn't seem to have a page number, but I think it turns out to be 7. Its topic is Terminology?

A. I'm there.

Q. And I think in order to assist the Commission, you tried to provide some basic information on definitions that would be used both in the interpretation of the language of Daniel Ball and the Arizona statute, and then also in helping them understand what you were talking about; is that fair?

A. That's fair.

Q. And one of those terms, the first one out there is floodplain, and you provided a floodplain definition; you indicated that there really wasn't a statutory definition for floodplain, correct?

A. No, that's incorrect.

Q. It's not correct?

A. There is no definition for the term "floodplain" in the navigability legislation, but the first bullet there is from a different section of the Arizona Revised Statutes.

Q. I'm sorry, I can't hear you.

A. The first bullet there, the definition is from ARS 48-3601. So that is part of the statutes. If you,

by statutes you mean the navigability of legislation, or just the Arizona Revised Statutes in general.

Q. So for your purposes, you think that ARS 48-3601, the part that you quoted there is a definition of floodplain?

A. It is a definition of floodplain.

Q. Okay. That's helpful. And so you went on to explain that the floodplain includes a low flow or main channel that is ordinarily inundated and elevated areas that are less frequently inundated, right?

A. That's correct.

Q. So in terms of the -- are you familiar with the term "high water mark"?

A. Yes, I am.

Q. Does a flood, the edge of the floodplain on either side of a river coincide with the high water mark?

A. Are you speaking of the ordinary high water mark, or are you just talking about high water marks in general?

Q. High water marks in general.

A. There are high water marks, are simply indications of previous elevation of waters. So the high water mark on a particular stream might not be a flood. It could be something lower than that. High

water mark is just a physical indication of the last, of a previous elevation of the water surface. There's an ordinary high water mark which has a different connotation.

Q. And what is the difference -- what's the connotation of the ordinary high water mark?

A. Ordinary high water mark has basically three primary characteristics. One is that there's some sort of topographic change. So a bank, if you will, along the stream bottom or some sort of flat surface and there's a topographic break. There's a change in the character of the soils from streambed materials to more upland soils where you have accumulation of fines, some change in the character from the streambed areas to the upland area, and also a change in the vegetation from aquatic or no species to more upland species.

Q. In terms of the floodplain, aren't there overt indications of the edge of the floodplain, also?

A. The floodplain -- yes, there are overt -- I'll answer that as simply I can. Yes, there are indications of the edge of the floodplain.

Q. So for purposes of navigability, which are you referring to in terms of the land over which the State is claiming ownership if the stream is found navigable?

A. If the stream is found navigable in Arizona,

the claim goes up to the ordinary high water mark.

Q. And is the ordinary high water mark something that is governed by the frequency of floods and the intensity of them?

A. Ordinary high water mark is defined, as I just explained, it's not tied to a specific frequency of flow.

Q. So it might include a 10,000-year precipitation event or a 100-year precipitation event?

A. Well, it wouldn't be tied to precipitation events. It would be runoff events, and it would be unlikely to include a 10,000-year event. That would be typically much greater than the ordinary high water mark. I would suggest a 10,000-year event is not ordinary at all.

Q. So the flood that may occur on, say, on the statistical frequency of a thousand-year interval, you're saying that the inundation caused by such a flood would not, which may include the floodplain, but would not include the high water mark?

A. A thousand --

Q. I meant -- pardon me, let me restate that.

Let's say a precipitation event on the Gila River that statistically may occur only at an interval of a thousand years would include the ordinary high

water mark, but it may also include the edge, outer edge of the floodplain?

A. A thousand-year event would very likely inundate and overwhelm the area where the ordinary high water mark was pre-flood and would extend well out into pretty much any floodplain that you could define.

Q. And those precipitation events, do you know how they are categorized in terms of frequency and likelihood?

A. Precipitation events? Or are you talking about runoff events? Precipitation is rain.

Q. Well, let me just include precipitation events which includes snow and, therefore, also runoff from snowmelt and other nonfrozen precipitation.

A. Correct. So the distinction -- I'm not trying to make a distinction between rainfall and snow. Obviously, they're both forms of precipitation. I'm trying to distinguish whether you want to know about stuff falling out of the sky or stuff running along the ground.

Q. I'm talking about when it starts running on the ground.

A. Okay. So we're talking about runoff events.

Q. And in fact, if there's a herd of blackbirds flying over and they have a precipitation event, go

ahead and include that.

A. Fair enough. So for runoff, how they're categorized in terms of frequency? That was your question?

Q. Yes, sir.

A. So they're generally -- it's a statistical measure and that -- how are they categorized? I'm not exactly sure what you mean by categorized. I'm just going to take a stab at it to move ourselves along here. And they're typically categorized by frequency, often by a term called return periods. You've been speaking of 1,000-year flood. You can speak of 100-year flood, a two-year flood. Each of those has a specific statistical chance of being equalled or exceeded in any given year. That's how they're categorized.

There are other folks that use categorizations in terms of mega floods, ordinary floods, annual floods. There are different descriptors and categories that could be used.

Q. In terms, let's take a 100-year precipitation event and the runoff that's related to it. It doesn't mean that it only happens once in a hundred years, does it?

A. No, as I just said, a 100-year event is more correctly termed a one percent chance event, and that

means it has a one percent chance of being equalled or exceeded in any given year.

Q. And it's sort of like throwing dice. You could actually throw snake eyes five times in a row, right?

A. You could.

Q. And you could have hundred-year flood events every two days for a while, couldn't you?

A. You could certainly have a hundred-year flood in sequential years.

Q. You could have them in sequential months, couldn't you?

A. You could.

Q. Or sequential weeks?

A. Depending on the river and the duration of the event, it's possible --

Q. Next I would like to go to the --

CHAIRMAN NOBLE: Mr. Sparks, could we break for lunch now?

MR. SPARKS: Mr. Chairman, I'm confident that you're in charge and we'll do whatever you say.

CHAIRMAN NOBLE: I didn't mean to interrupt.

MR. SPARKS: That's okay.

CHAIRMAN NOBLE: We'll break for lunch now. We'll try for 1:15.

(Recessed from 12:00 a.m. to 1:15 p.m.)

CHAIRMAN NOBLE: Mr. Sparks, you're back on.

BY MR. SPARKS:

Q. Mr. Chairman, Members of the Commission, Mr. Fuller, would you please turn to in your navigable PowerPoint to slide number 18.

MR. SPARKS: I'm looking for the one that gives common channel patterns. There you go, that one. Which one is that one?

MS. KOLSRUD: 16.

MR. SPARKS: 16.

BY MR. SPARKS:

Q. First of all, where on the Gila River are these two pictures taken?

A. As I mentioned in my testimony on Monday, neither of these pictures are in Arizona.

Q. Okay. So they're just examples of the two kinds of channels that you were talking about?

A. That's correct.

Q. Looking at the braided channel on the left, are you familiar with the kinds of modifications that, for instance, the Corps of Engineers does on some rivers to provide for a navigation channel in a river such as this one?

A. I understand the concept, yes.

Q. What are some of the physical techniques that they use to create a reliable navigation channel?
A. Dredging would be the primary one.
Q. And what are some of the other ones?
A. Dams, so that they're going to hold back water and release it at certain rates. Construction of levees would be another.
Q. And levees is to confine the spread of the water to a more narrow example than you might see there?
A. Yeah, but typically that's used more for flood control than creating navigable channels, but it can be done that way.
Q. When you confine, for instance, with levees, the spread of the river, what does that do to the water levels in the river generally?
A. Increases it.
Q. Increases the depth?
A. Yes.
Q. How about jetties, are you familiar with those?
A. I am.
Q. And what do the jetties do?
A. They're generally used to prevent lateral erosion of the stream, to point the main channel in a particular area.

Q. So if you create jetties into the river, for instance, on both sides, you can direct the flow to a preferred location for channel maintenance?

A. You can, yeah.

Q. And are you familiar with a navigational barriers in the river to raise the water level to a certain level from a navigation pool above?

A. Are you talking about locks?

Q. Not yet, but I'm going to get there.

A. Okay.

Q. Are you familiar with the navigation dams where -- or you might say navigation -- water barriers that raise the level in general of the pool above the dam?

A. Yes.

Q. And then the way navigation is used there is they usually prepare a series of locks, and what do the locks do?

A. A boat goes into the lock area. It's like a water elevator for boats, if you will.

Q. And so you can go from a higher elevation to a lower one or lower to higher one?

A. Correct.

Q. By use of the locks?

A. Yes.

Q. Are you familiar with the St. Lawrence Seaway?
A. A little bit.
Q. Somebody asked you about the Niagara Falls, I think that might have been Mr. Katz, but he's from Chicago, and I'm just not sure that he saw it. But one of the things I'm confident he has seen is ocean-going vessels in the area of Chicago and the Great Lakes. Do you have any idea how the ocean-going vessels would have gotten there?
A. Yeah, they came up the St. Lawrence Seaway, the Great Lakes. There's different channels that go between the Great Lakes. That's my general understanding of that.
Q. And so in aid of navigation, they created actually a series of locks to either raise or lower the water for vessels a step at a time so they could make access to the Great Lakes and also reenter the seaway below those elevations and make it into the Atlantic, right?
A. Seems like a reasonable explanation.
Q. And in terms of the statute that we are interpreting here, one of the references to navigability, and I'm looking at, I think, Exhibit 2 of your presentation. Could you pull that up? And navigable watercourse means a watercourse that was in

existence on February 14, 1912. I'm sure you're aware of that, but that's the date we're talking about. And then it's followed by a comma and a conjunction and says, "and at that time was used." Are you following me?

A. Yes, I am.

Q. "Or was susceptible to being used." Do you see that?

A. I still see it, yes.

Q. "In its ordinary and natural condition as a highway for commerce."

Have you considered the possibility that that language actually means something, that at that time, at that time on February 14, 1912, that the river was actually susceptible to commerce?

A. You're saying the intent of this legislation and the court cases behind it are to limit the condition of navigability to that particular date?

Q. I'm asking you if this is a statute -- not the case -- but what I'm asking you is did you consider that those words and that statute meant what they said, namely, on February 14, 1912, the river was either navigated or susceptible of navigation at that time. Did you consider that?

A. Did we consider it? Sure, we considered that.

Q. And you decided at that time didn't mean at that time?

A. The original reports, all of the information we provided was parsed into the period leading up to statehood, for the period of statehood, and the period afterwards so that all three conditions would be addressed long-term. So yes, we did consider that, and we parsed the information out that way. We also note that the next paragraph, sentence, clause says "ordinary and natural condition."

Q. Okay. And then after "it was susceptible to being used," there's another clause that said "in its ordinary and natural condition." See that?

A. Yes, I do.

Q. Have you considered whether or not that language actually means without modifying the river to aid in navigation, such as building detention dams, locks and jetties and dikes along the river without modification?

A. No, that's not what I understand that to mean.

Q. No, I asked you if you considered the possibility that that's what it meant.

A. You're asking me if I considered that this particular clause meant that what the statute was trying

to get at, irrespective of any cases, et cetera, court decisions, meant that ordinary and natural meant, not ordinary and not natural meant man-made modifications to the river channel to improve navigation?

Q. Well, let me see if I can state it a little bit more clearly, and that is, the river in the condition on that day, without modification by levees or dikes or canals, would have been navigable in fact?

A. I didn't understand that to be what ordinary and natural meant, so --

Q. Well, you can keep adding those words, if you would, but I'm trying to get to a different part of it.

I'm asking you if you considered the possibility that ordinary and natural condition on that date meant that the river could be used for navigation for trade and commerce on that day in that condition without any subsequent modification of the river to enhance its ability to carry navigation for trade and commerce?

A. Okay. Well, again, there were a lot of clauses there in your question. So yes, we considered the river in its condition on February 14, 1912. Yes, we considered it in the condition that it actually existed at that time. We certainly considered whether or not there were human modifications or not to the

channel. Those conditions, yes, were all considered.

Q. Okay. Now, in the part of the question we haven't gotten to apparently yet is what if you and I got together and said, you know what, we can make this river navigable if we simply put up some dikes in certain locations to keep the river from spreading out. Put in some jetties to concentrate the water in the channel that we want to maintain for navigation. And we can maintain, you know, 40 miles of the river channel that way. And if we put in a detention dam partway down and a series of locks, maybe two, we can deal with another 30 feet of the river decline. And from that point on, we can make it another 60 miles down the river. And we said, okay, well, we can do that. We can make this river navigable. So how does that fit with ordinary and natural condition on that date?

A. I don't think that would be the ordinary and natural condition on that date.

Q. Did you consider that that phrase was a phrase to prevent the kind of construction that I just made of that language?

A. That that phrase is oriented at preventing that kind of construction on navigable rivers?

Q. Preventing the interpretation of that language to prevent that kind of construction in terms of the

interpretation of navigability?

A. No, I guess I did not consider that the way you're phrasing it, which to be honest, is a little confusing. But as I understand what you're asking me, no, we did not consider that particular condition.

Q. So, if that condition meant prospectively, you cannot use prospective modifications in the future that can actually make this river navigable in determining on that day whether it was navigable for statehood, for title?

A. My understanding of the thing that I think you're asking me about is that affects commerce clause navigability and not title navigability.

Q. I'm talking about title. I'm also talking about commerce.

A. Well, we're doing our study with respect to title navigability, and I'll be completely upfront with you here, arguing the nuances between the different types of navigability is not what I came prepared to do today. That's better left to the attorneys and the courts.

Q. Well, what I'm trying to do is understand as an expert, you're a geologist. You're an engineer. You're a hydrologist, and you're versed in the history of this and other rivers. Did you consider -- and I

think the answer was no -- the prospective application of that language, ordinary and natural condition?

A. We did not consider a river condition that could be improved.

Q. Now, this is just a corollary from that. But if we pull back up the -- Item 16, I think it is, again. The picture of the two channels.

If you and I got together and said, you know what we could do here? We could get a navigation canal here, and this valley, these two valleys, assuming, are alluvium and digable, and we dig water out upstream here and we could get an 80-mile run on a canal if we just dug the canal up above the floodplain and diverted the water in at that location and we'd have a straight line like the Erie Canal all the way to the bay. What do you think about that? Did you think that would be a prospective modification?

A. Well, one, it's irrelevant to the Gila River. I can't think of any case --

Q. Look, your objection for relevancy, your lawyer can make those. I'm asking you just to answer the question.

A. I'm here to testify about the navigability of the Gila River. That's the nature of my presence. I'm really not the person to argue with you about these

conditions that you're proposing. So no, we did not consider whether somewhere on the Gila River you could have built a canal and whether that would have been navigable or not. That condition doesn't exist, so no, we didn't consider it.

Q. Okay. Now, are you aware of whether any of the historical materials that you provided for the record talks about whether a canal could have been developed in the upper Gila to serve parts of the area below downstream on the Gila?

A. There may be something in the record that talks about that, but it was irrelevant to the kinds of things that I was considering.

Q. I don't know, I think this would be slide 25 in your navigability.

I want to go back to the previous topic for one more question.

You went through several efforts to define the critical terms, as I see it, those terms you felt were critical and the definition under the statutes. I didn't see an explanation by you in your PowerPoint that defined what "at that time" meant?

A. "At that time"? You're correct, you did not see that.

Q. And do you have an understanding or something

that underlies the rest of your testimony about what "at that time" meant?

A. Again, I think that's something that is more up to the courts to make the final decision on. My understanding of that was that some of you attorneys were arguing for that particular date, that one day of statehood, and others were arguing for a broader period of time as of the time of statehood. So we provided information for both conditions. Personally, it seems more likely if we're talking about ordinary and natural condition that to limit it to one day would not necessarily be representative. So you would need to look at something broader in order to get the context of what ordinary meant. And also you're talking about variations over the course of a year so clearly it's broader than a single day.

Q. Broader than a single day, but what about substantially in that period of time, say within a four-year window?

A. I think it would -- that might be a reasonable place to start. I think you would also want to look at the specifics of this particular river and that particular time. Was it a period of unusual drought? Was it a period of unusual flooding? Was it ordinary and was it natural?

Q. Then in determining about what you were going to present to the Commission about ordinary and natural, you felt like you needed to go to a time before relatively contemporary historical diversions from the river; is that right?

A. Yes.

Q. And how far back in time did you feel like you needed to go in order to pick up and analyze what was likely the condition of the river in its ordinary and natural condition?

A. Well, I think in some respects you don't actually need to go back in time at all. You just need to determine what the flow rates would have been prior to the time when they were no longer natural flow rates. From the hydrology standpoint, you do the reconstructions that you're going to hear about in the rest of the week, I'm sure. Yeah, you develop that hydrology and that's irrespective of a particular date.

In terms of identifying a point from the channel itself, there are a number of different ways to do that. I think you'll hear about some of those. It's also a discussion that centers around what the nature of the changes have been since statehood, since more recent man-made disturbances have been in the channel. So I would argue that there is not a specific date that you

need to look at. You're looking at a range of things, conditions that depict the ordinary and natural condition.

Q. So did -- for any particular location on the river -- you pick a particular date and then try to reconstruct the condition of the river on that date for that location?

A. No particular date, no.

Q. Did you pick a date -- now I'm going to speak now to Segment 3 and the Calva gage. For the Calva gage and the location, did you pick a particular date in prior history when you tried to reconstruct the river at that point for that purpose?

A. No. Not a particular date for any place on the river.

Q. And for no place on the river?

A. That's correct.

Q. Would you turn to, I believe it's slide 25, please? The first statement there is for the Gila River, what are you doing? It says ordinary and natural condition. You say for the Gila River, identify the major change to the river system, and then, and for you that was changes that caused a reduction in flow, right?

A. Yes.

Q. Did you also consider conditions that may have

caused a geological shift in the elevation of the river?

A. No. Well, theoretically yes, but I'm unaware of any geologic shifts in the river.

Q. Are you aware of an earthquake -- and you know where the Artesia area is in the upper Gila?

A. That place name doesn't mean anything to me, but if you pointed on a map, I can tell you.

Q. Are you aware of any earthquake that changed the production of water from springs in the upper Gila?

A. In the 1890s, I believe it was, was the Aqua Prieta quake. It was just over the border in Mexico that had that kind of impact in southern Arizona.

Q. But specifically on the Gila, you're not aware of the effects, if any?

A. No.

Q. Okay. And then your statement says solution, add back in the lost flow, right?

A. Yes, it does.

Q. And yesterday I tried to figure out how you decided how much to add back in and where you decided to add it. And I didn't have very much luck -- well, I got answers, I just didn't understand what they were. So being the slow kid that I am, I'll try to be very specific.

At the Calva gage on the Gila River in Segment

3, did you add back in water at that gage to reproduce what you consider to be the ordinary and natural condition of the river prior to statehood?

A. As I've testified to a number of times now, my approach was to use the modern gage record as an absolute minimum. There are other experts here that have done calculations to add back in the flow, if you will, to compute what the ordinary and natural flow rates were. I'm using those experts' data sets. Those numbers are uniformly higher than the numbers that I used.

Q. So let me --

A. So where they add that back in is at the gages. Those gages are representative of the flow over broader segments of the river.

Q. Would you turn to slide 26, please. Up there it says, the relevance of the hydrologic data provided, and the first bullet is gage record underestimates the natural flow rates. Is that your statement?

A. Yes, it is.

Q. On what authority do you make that statement?

A. By simply comparing the numbers.

Q. Comparing what numbers?

A. The long-term gage records as I've mentioned, they have median flow rates. If I compare those to the

estimates of pre-development or pre-depletion flow rates, the gage record numbers are smaller than the pre-development estimates made by others.

Q. So it's not -- you clearly don't know what the pre-development flows were, in fact, do you?

A. The estimates that were made, I'm relying on the estimates that others have made. I can tell you that I do know for a fact that if you take water out of the river, it will deplete the flow and the discharges will be lower. There's no argument about that.

Q. Doesn't that depend on whether you take it out and put it back in or not?

A. Clearly, if you take it out, use none of it, and put it right back in, it will be the same.

Q. So if you use for the water wheel, take it out, run the water wheel, it goes back, it doesn't deplete the flow, does it?

A. I will grant you, for all of the water wheels that existed on the Gila River, that would be a true statement.

Q. Do you know whether there was one at San Carlos?

A. If it's not changing the flow rate, it doesn't make a difference.

Q. Then the gage record underestimates the

natural flow rates. Are you familiar with the USGS rating techniques on their gages?

A. Yes.

Q. And so do you recognize the fact that gages have a range of error in them?

A. I certainly do.

Q. And the range of error on a gage is considered highly accurate for USGS is what?

A. Above five percent.

Q. So that can be five percent more?

A. Plus or minus.

Q. Or minus. And what is the range of gages before they decide they need to get another one and put it in there?

A. What is the range of gages?

Q. The range, in other words, of accuracy. If you've got one that's ranging 50 percent, plus or minus, is that time to replace the gage or what?

A. I'm not sure that would be part of the factor in replacing a gage. It would be many other factors. Usually the river decides for you or property owners. Gages are typically either, you know, excellent, good, or poor. And there are different percentage rates of accuracy. But USGS stream flow data is the best there is. There's not really another game in town.

Q. So in terms of your statement, gages, gage record underestimates the natural flow rates; it might also overestimate it, may it not?

A. No.

Q. Not --

A. No.

Q. Not possible?

A. Not very likely at all. Not within a reasonable scientific probability.

Q. Well, within the range of accuracy, if the range is plus or minus five percent, it seems like it's just as likely to be more or less than exactly accurate --

A. The only way you would ever get to know that --

Q. -- by five percent on either direction. And one side is overestimating it, right?

A. The only way you'd have to know to make that kind of a judgment of a comparison would be to use the gage data itself. So you've already contaminated your analysis.

So if you take -- the simplest way to do this is just use common sense. Forget all the gage stuff and just say, if I take river water out of the river, it's going to have lower flow. If I'm looking at an estimate

that's based on the flow with the water out of the river, it's going to be lower than what it was in its natural condition. That's just common sense.

Q. I'm referring to the gage itself. It says, your statement says, gage records underestimates the natural flow rates. Now, it also can overestimate the natural flow rates, no?

A. It underestimates relative to the ordinary and natural condition.

Q. You're talking about some previous time in history then, not the day, not the day that it's measuring?

A. Of course.

Q. So the day it's measuring, it can underestimate or overestimate the flow of the river, the natural flow of the river that date, right?

A. Okay. I misunderstood your question. I thought we were talking about something else.

Yeah, on a given day, yeah, you can have a low estimate or a high estimate.

Q. And if it typically -- maybe that gage overstates all the time by five percent; it's overstating the natural flow of the river, isn't it?

A. I suppose that's possible, but the USGS is pretty rigorous about trying to evaluate those kind of

conditions. They go out and they field check the data, they create those rating curves. They do their best to eliminate those kinds of conditions.

Q. I agree with that. I'm talking about the functional fact. And the fact is, they can overestimate the natural flow?

A. Theoretically possible that could happen on a given day, yes. What you're talking about there is not what the point of the slide is. It's not the message there.

Q. I'm trying to make a different point than your slide is making.

I would like to refer to slide 39, please.

CHAIRMAN NOBLE: We're ready to proceed, Mr. Sparks.

MR. SPARKS: Pardon me, Mr. Fuller, but I can't read the item number. Is that 39?

THE WITNESS: Yes, it is.

MR. SPARKS: Thank you.

BY MR. SPARKS:

Q. Would you describe the -- you used the words there, describe the segment of the river called No. 3 from the Gila Box to the San Carlos Reservoir, Coolidge Dam, please.

A. So the question is would I describe that

reach?

Q. Yes, using those words there.

A. Sure. It's perennial or it was in its ordinary and natural condition. It has a compound channel pattern. It has a pool and riffle pattern with a sand and gravel bed material. The main channel is sinuous, sinuous to meandering, I would say. It occurs within a broad valley of alluvium. There are no rapids or natural obstructions in that reach, and the major tributary is the San Carlos River.

Q. Now, one of the things that I don't see here is an observation about whether or not any portion of that reach includes a losing, a part of the stream that is in a losing condition. In other words, loses water from the flow to groundwater surrounding it or underlying it.

A. That is correct. You do not see that.

Q. Thank you. So is there a reason why there's no reference there?

A. Yes, because I discussed it elsewhere in my presentation.

Q. And do you discuss whether that losing condition exists in that reach at all?

A. Yes, I do.

Q. Okay. Where would that be?

A. It's a losing stream over the length of its valley, of the river valley, over the length of Segment 3.

Q. I'm sorry, I did not hear you.

A. Segment 3 is a losing reach over its length.

Q. And the question I then have is, in calculating what you would add back in to the natural flow to try to figure out what it would have been at Calva, did you calculate in the loss from the river that would have occurred in that zone, that segment?

A. Once again, I did not do any unique calculations myself. I relied on the calculations of others. Generally discharges go down in the downstream direction much as they do in the modern gage record. Therefore, yes, that was considered.

Q. But you didn't do any calculations to adjust for possible loss from the stream for that purpose?

A. I'm not going to change my mind. No, I did not.

Q. That wasn't a trick question. I just, you know.

A. It's a repeated question about four times now, so --

Q. Well, you're better at math than I am.

A. Clearly.

Q. Would you turn to Exhibit 100. That is a reference to Chiricahua Apaches in Segments 1 through 3. What's the source of that information?

A. It was information provided in the Land Department's reports. I believe it was also referenced in the reports by Barbara Tellman. Let's see if I wrote anything else down on that. And those reports would point at the original sources. That's correct.

Q. And does that report the original source of the information?

A. No, the Land Department reports and the Tellman reports would have references to where that citation comes from.

Q. Do you know when I referred to aboriginal territory of southwestern Indian tribes what I'm talking about?

A. I have kind of a general understanding of that.

Q. Do you know whether the Chiricahua Apache aboriginal territory included the upper Gila River, Sections 1-3?

A. I'm relying on the -- I don't have any specific knowledge on the limits of those territories. My understanding from having read those sources that I just cited, that's what their conclusion was.

Q. Have you ever seen a bull hide boat?
A. I have not.
Q. Ever seen a bowl boat?
A. A bull boat?
Q. B-O-W-L boat. Bowl boat?
A. A bow boat?
Q. B-O-W-L.
A. Bowl boat, sorry. I've seen pictures of what I would consider to be a bowl boat but not in person, no.
Q. How about a wicker basket boat?
A. Just pictures.
Q. Do you think it would be useful for doing, say, anymore than carrying provisions across a river so you didn't get them wet?
A. Well, in fact, this slide says they were using those boats to cross the river. Whether, in fact, they would be useful for going other directions, I don't know. Could be.
Q. As a river man, how do you think a bowl boat might work on Reach 4?
A. I would be willing to give it a try.
Q. Especially in Needle's Eye, do you think that would be good?
A. Depends on the design of the boat, but I can

think of better ways to get through there. Kind of doubt that navigability or not hinges on whether I could take a bowl boat through Reach 4. If it did, I would.

Q. I'll tell you what, I'll rig one up and we'll try it.

A. Deal. Let's do it tomorrow.

Q. It's not like cereal -- you're not Mikey -- you won't try just anything. But you would try that?

A. I would try that, sure.

Q. Okay. Slide 115, please.

What reference do you have for that particular trip? What's the source of that?

A. Granger, 1983.

Q. Granger what? Newspaper, book?

A. Granger is a book.

Q. A guy standing outside the courthouse, what?

A. Granger is an Arizona historian.

Q. Do you know when that was published?

A. 1983.

Q. Did you look at Granger's reference for that particular story to see --

A. I looked at the story there, and it says nothing more than that sentence.

Q. Turning to slide 136, please. Looking at the Calva reference, first of all, Segment 3, you have some

asterisks on the flow rate, on both the flow rate and CFS and at the median and 90 percent range. What does that mean?

A. What does the median mean, and what does the 90 percent mean?

Q. What do the two asterisks mean?

A. I see at the bottom there the two asterisks, it says flow rates are from a publication from the USGS. Greg Pope was the lead author from 1998. I didn't have median and a 90 percent flow rate in the report, the original report by the Land Department, so I added that data set in.

Q. And for Coolidge, there's not a rate. There's just an asterisk at those two locations?

A. That's correct.

Q. And that just means you don't have that information?

A. It was not in the original report by the Land Department, so we used other sources.

Q. Turning to slide 145, please.

Look at the part that says Calva. So it's the bottom section, correct?

A. I see it.

Q. Okay. There is a note on the top width in feet; there's an asterisk there which means what?

A. It means the information wasn't provided.
Q. And the top width of what wasn't provided?
A. Top width of the low flow channel.
Q. Is there any width of the low flow channel provided there?
A. No. Not to say that it doesn't have a width. I'm saying the information was not in the Land Department report regarding the width.
Q. So in order to know the hydrologic depth, wouldn't you need the width of the channel?
A. I'm telling you that the value of the top width was not provided in the Land Department report.
Q. What I'm asking you then is how did you determine the hydrologic depth for that gage?
A. It was from a rating curve that was provided, and, in fact, maybe maximum depth of that, but I could go back and look.
Q. So you did not attempt to calculate the width or the nature of the channel at that location?
A. No, as I mentioned in my presentation, generally if there's enough depth, there's enough width. You know, it's a ratio of ten to one or greater. So it's, you know, typically probably be more like 40 to one, streams in Arizona.
Q. Let's just talk about the location of gages in

general. Do you have an understanding of where they are typically located?

A. Yes.

Q. And what would that be?

A. Well, there are a number of constraints of where to put gages. One is principally where do you need flow data. Another is where can you get access to the river. You have to be able to get there and service the gage, maintain it, repair it. Another is where you want to have a decent rating curve where you have some relatively constant relationship between stage and discharge. You want the river to be relatively stable there. These days, you want an area where you've got line of sight so that you can get out either telemetric data or satellite data, be able to see the sky. There are a number of constraints, and it's a menu and you pick from them. You very rarely get everything you want.

Q. Is it also a situation where if you have a braided channel upstream from the gage and there's a number of the channels are carrying water, that you prefer to have one where the water is concentrated in one channel?

A. Typically, we pick the lowest one, if you could get at it.

Q. And is it also preferable to have one where it's the only channel carrying water at that location?

A. Given the choice, if you have a choice, picking a single channel over multiple braids, you would pick a single channel, typically.

Q. There is a section in the draft report -- and I think it's Appendix I in the final report -- called land ownership, and it has some maps in it. Are those maps in your computer so that you can bring those up?

A. They are not.

Q. Okay. So none of the maps that show, none of the maps in the final report on land ownership are in your computer?

A. Those particular maps are not in my computer, but I'm sitting in front of some maps that have land ownership on them.

Q. How about the land use maps, do you have land use maps in your computer?

A. I do not have that report in my computer. However, I believe it's an exhibit, somebody's. I looked at it earlier.

Q. And the Gila River photography in that report, do you have those photographs?

A. I'm telling you I do not have that report in my computer.

Q. So there's nothing in your computer except for your PowerPoint presentation?

A. There's a lot of things on my computer, but as it relates to these hearings -- you're not going to get into my personal finances.

Q. Okay.

A. As it relates to these hearings, again, I have the PowerPoint presentation. I have the Google Earth flyovers. I have the field photographs from my canoe trips. I believe that's what I have on there as relates to these hearings.

Q. Do you have any of the documents like in the disclosure from the Land Department like document number 70, which is entitled Irrigation and Agriculture Practice in Arizona, Tucson, Arizona, June 30, 1911?

A. I don't. But I'm sitting next to some attorneys that might.

Q. I'm just talking about whether you have it.

A. I do not.

Q. So it's not something that you worked on?

A. No, it's part of the Land Department report. I did the two revisions of it. I doubt that we revised the appendix, but I'm not looking at it, so I don't know specifically. If it's a document that was just included, then no, obviously I wouldn't have revised

that document.

Q. I just wanted to go for a few minutes to your boating section, your boating report.

A. Okay.

Q. My page says 8. It's the one that has references to the Missouri on it.

A. Okay.

Q. You're digging in my backyard when you're talking about the Missouri so you have to be sort of careful. I realize how delicate you are with my feelings but even more delicate here would be good.

What I was trying to understand is what the relevance of the 27-year comment is to navigability.

A. Yeah, as I mentioned in my presentation and again in cross-examination yesterday, the relevance of the 27 years is that sometimes upon reaching a river with the kind of boats that are available to them at that time, the kind of boats and the skills that they have aren't sufficient to be able to navigate the river. Once you get on the river, you learn some new skills, you make some modifications to a boat, and it takes some time but then you're navigating that river, and that's the point is that it takes time.

Q. So do you think -- is there a date certain that you think that 27-year period started on the

Missouri?

A. No, I don't think that this is -- it was on January 2nd of whatever year it was, and then 27 years, and 265 days later. No, I think 27 years is the generalized statement from this author, but whether it's 27 or 26 or 25, I don't know how that's --

Q. And so the citation is to this River Boats in America, 1966, is that the source of that statement?

A. Yes, it is.

Q. So it's not about whether the Missouri was navigable 27 years earlier. It's just how long it took them to figure out how to get mechanized boats up the river?

A. Yes. I would think this quote is interesting in that respect. Also interesting, as I pointed out, this author points out that commercial navigation, commercial boating was limited to canoes, flatboats, and keelboats. I thought that was an interesting statement as well, which underscores my own opinion.

Q. And then several times during your testimony you've mentioned the skill or experience of the boatman. Do you think that the experience or skill of the boatman has anything to do with whether the river is navigable or not?

A. No. It has more to do with how well they

boated.

Q. Did you look at in the historical data about, or reports about what people in Arizona and elsewhere in the United States thought were the navigable streams in Arizona in 1912?

A. I've seen some quotes along those lines, yeah.

Q. And do you think that what those parties thought in terms of navigability and potential for navigation and commerce on the river should have weight before this Commission?

A. I think any evidence, any discussion of the river's navigability should be included, and I think it should be included in light of court decisions that those observations, those opinions are made for the river in its ordinary and natural condition. And also that they were considering navigability from a title navigability perspective.

Q. Do you know of any references at the period of 1911, 1912 that you can provide to the Commission that shows what the thinking was at that time about the navigability of the river?

A. I think there have been a number of things that have been submitted for people's opinions about the river in 1912. But none that I'm aware of that discuss it in its ordinary and natural condition or that are

applying the Daniel Ball Test.

Q. Just speaking specifically what their view was on, on or about the time of statehood; namely, at that time, what was their view?

A. Which person are you talking about?

Q. I'm just asking you if you referred the Commission to any references to the thinking of people involved in river navigation, river use at that time? For instance, are there any scientific papers?

A. On the Gila River, I'm not aware of any scientific papers where people were considering the Gila River in its ordinary and natural condition for purposes of title navigability.

I'm aware of people who said the river is navigable, Bartlett being one of them. I'm aware of people that said it's not navigable, Bartlett being one of them.

So yeah, there are a number of people that rendered opinions. The territorial legislature made some statement regarding the Colorado River being the only navigable river. They don't specifically mention the Gila as being nonnavigable, but by exclusion. There are a number of other things like that. You'll probably hear more of that in the next two days.

Q. What about government reports?

A. What about government reports?
Q. Do you refer the Commission to any government reports discussing the condition of the river in terms of navigability at that time?
A. I guess the government reports I would refer the Commission to are the reports that are in our previous two reports and in the presentation right here. I'll limit it to that.
Q. When I referred you to the slide about the Calva gage and I pointed out that there wasn't any information about the width of the channel at that location, do you have a general rule or a scientific rule in hydrology or geomorphology about what the width of the channel would be in order to understand the depth of the channel in the context of particular flow?
A. Yeah, there are -- you guys are going to love this. There are hydrology geometry equations that describe those kind of relationships. They relate discharge to a power, depth to a power, length, width, and depth. You know, there are relationships that you can use to estimate typical relationships of width and depth.
Q. Did you mention in your testimony that you thought there was a 40 to 1 ratio?
A. I just said that earlier. I would say that

would be a reasonable feel, rule of thumb.

Q. Well --

A. I'm not sure you're going to find that in a scientific journal anywhere. That's Jon Fuller speaking about Arizona.

Q. Okay. And given, let's say, the low flow channel at Calva where you show it to be in the range of a half foot, then you're assuming that at that point the channel was what, 20 feet wide?

A. That sounds like about a reasonable estimate, yeah. I would expect that.

Q. And what if the channel is a thousand feet wide, what would your result be?

A. I don't think we're talking about the same kind of channel.

Q. That what?

A. We're not talking about the same kind of channel.

Q. No, I'm asking you the question. If it was a thousand feet wide, what would the -- the same amount of water, how would it appear in the low flow channel?

A. If you're saying that the channel were half -- the low flow channel were a half foot deep.

Q. No. I'm saying it was a thousand feet wide and you had the same amount of water, how deep would the

low flow channel be?

A. Well, first of all, that's not the low flow channel. But if that condition somehow magically developed and science is defied, it would be shallow, very shallow.

Q. Like would an ant drown in it?

A. You know, I'm not here prepared to testify about the swimming abilities of ants.

Q. There are some ants that make pretty good boats. But I'm not going, you know, to require you to know that.

A. All right. It would be less than a half foot. Is that helpful? It would be, probably be fraction of an inch at thousand feet wide.

Q. Ms. Kolsrud has a few questions that she wants to ask that carries on with things that I didn't get to.

CROSS-EXAMINATION

BY MS. KOLSRUD:

Q. Actually, I just have a few questions to clarify some stuff that was already asked. I've had to read through all this stuff for the first time, so I have not been privy to the past hearings and know what's, you know, been asked by who and in what kind of manner.

Can you bring up slide 80 from your Gila River presentation?

A. Yes, I can.

Q. I know yesterday that you had said that you hadn't read the James O. Pattie journal completely. And when you were talking to Mr. Hood, you mentioned that you used a daisy chain method of research? What is a daisy chain method of research?

A. What I was referring to was that I am citing information that came that was previously in the Land Department reports. It was in reports by Barbara Tellman. Other reports that discussed, either we had prepared or participated in preparing, and they were pointing at the original source. So my daisy chain, if you will, is from here to those reports to the original sources.

Q. And can you turn to the next slide real fast for me? Let's see here. Under Segment 7, the fourth bullet. Who is Turner?

A. I don't recall specifically but he was a member of the Kearny Expedition. I don't recall his rank or his position.

Q. Did you happen to read the original journal of Henry Turner?

A. I did not.

Q. Do you happen to know if there were any other people that were in the army of the West that had journals or diaries or memoirs that could have been looked at or used?

A. I don't know specifically as I sit here today.

Q. So you've never heard of Dr. Charles Griffin?

A. I have actually.

Q. Oh, you have?

A. I think, I think I've cited something he said somewhere along the line.

Q. So do you recall whether or not you read his diary?

A. I know I did not read his diary, at least not in its entirety.

Q. And did you read Emory's reports in their entirety?

A. No.

Q. Kearny's report is in the record. Did you read that one in its entirety?

A. No, I did not.

Q. Did you happen to, when you quoted Emory and Turner, did you happen to cross reference the dates of when they made these specific comments?

A. The specific dates, no, I -- I don't have that written down here. Again, I'm reporting what was in the

Land Department report, and there were others who did the historical research that I'm summarizing and reporting on here.

Q. Okay.

A. They may or may not have written the entire journals, I don't know.

Q. Have you seen the entire journals, or did you just read what was already in the report?

A. I would have seen the report and whatever else I've seen that's been disclosed.

Q. Okay. Those are the only questions I have. Thank you.

MR. SPARKS: Thank you, Mr. Fuller. Thank you, Members of the Commission, Mr. Chairman.

THE WITNESS: You're welcome.

CHAIRMAN NOBLE: Thank you.

Mr. Helm, do you have some questions?

MR. HELM: Just a couple.

CHAIRMAN NOBLE: While Mr. Helm is moving up and Mr. Sparks is moving out, we'll take a break.

MR. SPARKS: Mr. Chairman, I just want to make a satirical comment about that statement. I need to know the logarithm that he used on the conclusion that he had a couple of questions, and that will help me understand how long I can be sleeping.

CHAIRMAN NOBLE: Yes, sir, whatever that meant.

MR. HELM: It's been as long as I slept since he's been talking.

CHAIRMAN NOBLE: He needs a break.

(Recessed from the 2:16 p.m. to 2:29 p.m.)

CHAIRMAN NOBLE: Go for it.

MR. HELM: We'll try and make it quickly.

CROSS-EXAMINATION

BY MR. HELM:

Q. Mr. Fuller, you've been an expert witness at a number of these hearings, correct?

A. Yes.

Q. You've been an expert witness in a number of court cases, correct?

A. Yes.

Q. So you have a little bit of experience in how witnesses prepare to be an expert in rendering opinion either in court or in one of these types of hearings, correct?

A. I do.

Q. Is it unusual when you're doing that to rely on other experts' opinions who are recognized in the field to help construct yours?

A. I would say no. It's more common than not.
Q. And in fact, if you look at the work that's been done by virtually every expert that's going to appear in front of this Commission in the next few days, they all relied on other people, didn't they?
A. To some degree, yes.
Q. The next question, I believe it was Mr. Sparks talked to you about the River Information Digest. Do you remember that?
A. I recall that, yes.
Q. Okay. And the publication date on that, at least on the copy that was handed to me is 1985?
A. Yes, it is.
Q. Okay. Does it state anywhere in here that it was prepared in accordance with the natural and ordinary conditions of the rivers it talked about?
A. I did not see that anywhere, no.
Q. Okay. Now, he talked specifically about, and I'm sorry, I didn't get the big copy. I got the little copy, so I have to take off my glasses to see the darn thing.
He talked to you about kayaks, correct?
A. He did.
Q. And if you would look under the commercial category down there, at the line where kayak appears,

would you read the full line?

A. "Small craft, kayak, et cetera."

Q. Did he ever define for you what a small craft was?

A. No.

Q. Okay. Did he ever define for you what et cetera was?

A. No.

Q. Do you think that maybe the et cetera or the small crafts might have included flat-bottom boats and canoes?

A. That sounds reasonable, sure.

Q. Either that or in the et cetera category?

A. It definitely would fit in as an et cetera.

Q. Okay. And canoes, I mean, we're talking about the Interagency Whitewater Committee. They are obviously aware of canoes.

A. You would think.

Q. Yes, you certainly would. Do they mention it in here anywhere?

A. I didn't see the word canoe there, no.

Q. I didn't either.

Lastly, you've been cross-examined by everybody and their dog about trade and travel up the river, trade and travel down the river, whether trade

and travel have to be combined, and whether they've got to be for commerce. Do you recall that over the course the last couple days?

A. Yes, I do.

Q. Okay. Just to kind of sum it up at least from the picture of the Defenders of Wildlife case, which I believe you were a player in as of about two cases ago?

A. I was here then, yes.

Q. I've just taken the liberty of underlining three little lines in that case. Would you read those three lines verbatim?

MR. SPARKS: You probably brought enough of those for everybody, right?

MR. HELM: Pardon me?

MR. SPARKS: You probably brought enough of those papers for everybody to look at, right?

MR. HELM: No, I didn't. But I thought you would have read it about 14 times. And your questions didn't seem to indicate that you had.

MR. SPARKS: I was just thinking about all the other people in the room.

CHAIRMAN NOBLE: Gary, are you able to get that interplay on the record?

THE REPORTER: Yes.

BY MR. HELM:

Q. Could you go ahead and read it, please?
A. This is from Defenders of Wildlife v. Hull, Page 421, second column, second full paragraph midway down, it says, "The federal test has been interpreted to neither require both trade and travel together nor that the travel or trade be commercial."
Q. Thank you. Just so I get a little overkill in there, we'll go over to Page 422, and I took the liberty of underlining another little statement in there. Would you read that one verbatim, please?
A. Yes, this is Page 422 of the same report, second column, Item v, Profitable Commercial Enterprise, "As discussed above, nothing in the Daniel Ball Test necessitates that the trade or travel sufficient to support a navigability finding need be from a profitable commercial enterprise."
Q. Thank you. I have no further questions.
CHAIRMAN NOBLE: Thank you very much.
Mr. Katz, are you next?
MR. KATZ: I guess so.
CHAIRMAN NOBLE: Mr. Fuller, do you think you can withstand this?
THE WITNESS: I think I can withstand to the end, thank you.
CHAIRMAN NOBLE: Remember, this is your

friend, Jon.

MR. KATZ: Was that past tense?

THE WITNESS: With friends like this --

REDIRECT EXAMINATION

BY MR. KATZ:

Q. Mr. Fuller, I'd like to promise you that I won't be too long, and I want to try to make a commitment to the Commission that I won't be too repetitive. But this is our one chance to at least lay the groundwork on this particular river system.

Since we started out by asking you about the Defenders of Wildlife case, that was a proceeding that was argued by the Arizona Court of Appeals around 2001, correct?

A. Correct.

Q. And in that proceeding, if you recall -- and I can give you the case to look at again -- we were operating under a Title 37 statute regarding navigability determinations of Arizona rivers under a system whereby statute the river or rivers in Arizona were presumed to be nonnavigable. Correct?

A. Correct.

Q. And the statute also provided that the burden of proof was not preponderance of evidence or more

likely than not. It was clear and convincing evidence?

A. That's my recollection, yes.

Q. And the statute also set out criteria that were supposed to be used to determine the navigability of the river which aren't necessarily consistent with the criteria that are set out in the Dan Ball case and that were set out with greater specificity in the case that you just were referred to, the Defenders of Wildlife case, at 341 Arizona Advanced Reporter 3 is the copy that I have. But you might have been looking at another copy. Is that correct?

A. Correct.

Q. And that's a 2001 decision, correct?

A. Yes.

Q. I don't recall the exhibit number -- and maybe my colleagues can help me out in that regard -- but you were referred frequently by Mr. Hood and others to this final report "Criteria for Assessing Characteristics of Navigability for Small Courses in Arizona," that was written in September of 1998, correct?

A. That's correct.

Q. And this sets out numerous criteria for determining the navigability of a river in Arizona based upon the statute, required statute scheme and not based upon the Arizona court's subsequent ruling in the

Defenders of Wildlife case, correct?

A. That is correct.

Q. And the statutory scheme, if you recall, was largely set aside and declared to be in violation of the Arizona Constitution or the United States Constitution, correct?

A. That's correct.

Q. And again, under the Defenders of Wildlife case, you were asked earlier by Mr. Murphy repetitively, trade and travel, with "and," the conjunctive rather than the disjunctive "or." Defenders of Wildlife that you just read from says it can be trade or travel, correct?

A. That's correct.

Q. And you were also asked by numerous other lawyers or several other lawyers about commercial viability or profitability. Arizona case, Defenders, that we rely on here today doesn't require that it be for commercial gain or profit, does it?

A. No, it does not.

Q. And since we're dealing with case law -- and I'm not asking you for legal opinions, and I know that each fact situation is different, one from the other -- but the United States versus Utah case was decided in 1931 or thereabouts, correct?

A. That's my understanding, yes.
Q. And a Special Master was hired or appointed by the Court to do a detailed report regarding the navigability of -- was it the Green and Colorado, and portions of the Colorado River?
A. And the San Juan.
Q. And the San Juan. And in that particular case, the Special Master, as well as the judge that decided the case at the trial court level and the higher courts as well, were required to rely upon the facts that were presented to the Special Master and/or the court, correct?
A. Correct.
Q. And going back to the Daniel Ball Test and all of the other federal case law that you may have glanced through over the years, each river's navigability is supposed to be determined on its own unique facts, correct?
A. Correct.
Q. And the case law, Daniel Ball says, that navigability in fact. And that's what we're trying to determine, whether or not at statehood --
A. Yes.
Q. -- the river was navigable in its ordinary and natural condition, correct?

A. Correct.
Q. And if it is navigable in fact -- and that's what this Commission needs to determine -- it is navigable in law, correct?
A. Correct.
Q. And we've spent a very large amount of time in this case talking to you, or at least others have talked to you, about the river history, correct?
A. Correct.
Q. And sometimes history is better maybe than science, and other times science might be better than history when it comes to determining the unique facts of a particular river or river system?
A. Yes.
Q. When we deal with a river, it has unique characteristics, correct, and we've been through a lot of those?
A. Yes, it does, each river is unique.
Q. And you've already told us that when you take a look at the Gila River today, at least Segments 1 through 5 we'll take a look right now, in today's condition with substantial upstream damming and diversion, are Segments 1 through 5 of the Gila River today with that major change in ordinary and natural condition navigable perennially?

A. Certainly Segments 1 and 2 and 4 and 5.
Q. And what about Segment 3?
A. Segment 3 is substantially depleted of water most -- a good chunk of the year.
Q. And is that as a result of natural conditions?
A. No, it is not. Man-made diversion.
Q. And if you didn't have the man-made diversion, significant agriculture within that segment, do you believe that if we put that water back in at the time of statehood, that Segment 3 would be navigable?
A. Yes, and also add that based on the visits that I've made to the portions of Segment 3, I've not done it myself; but in other projects working along that reach, my observations of the river is that I could put a boat in there. It would be a low water boating situation during significant chunks of the year still in Segment 3.
Q. You were asked a number of questions about the Santa Cruz, San Pedro, and San Francisco Rivers, correct?
A. Yes.
Q. And while you at times may have been more familiar with those river systems than you are here today, you did not focus in on or review all of the data, reports, and evidence that was presented before

this Commission on the San Pedro or Santa Cruz Rivers in prior 2005 or thereabouts hearings?

A. Meaning preparing for this, did I --

Q. Right, in preparing for this.

A. Right, I did not.

Q. Did you reread the San Pedro and Santa Cruz reports?

A. No.

Q. And again, when you were hired by the Land Department to revise the reports on all of the river systems here in Arizona in or about 2003, did you start out with any presumption that any particular river was or was not navigable?

A. I did not.

Q. And did you try to do the best you could to do a factual, historical, and archaeological investigation?

A. Yes.

Q. And when we look at the flow rate or flow curves that other experts in these proceedings have previously presented to this Commission and are presenting again in their reports that are either in evidence or will be in evidence, you've indicated repetitively that their low flow rates and their median flow rates, their recreations of what the river would have been like in its ordinary and natural condition

would make the river navigable in all eight segments perennially; is that correct?

A. That is my opinion, correct.

Q. And while we can debate -- and others have previously -- as to whether the San Pedro River was navigable at statehood, before it was diverted, which was prior to statehood, correct?

A. Right.

Q. There was substantial diversions prior to statehood?

A. There were.

Q. San Pedro contributes today and contributed more to the Gila River prior to statehood than it does now?

A. That's correct.

Q. San Francisco, the same way?

A. Yes.

Q. And what about the Santa Cruz River?

A. I would say the Santa Cruz is not significantly different in terms of its contribution to the Gila River on the surface.

Q. You spent a lot of time discussing the types of boats -- and you don't need to pull it up -- but slide 7 was several types of boats that were available in and near Arizona around 1912, correct?

A. Correct.
Q. But again, it's your understanding that whether or not these boats were used, the technology was available to both settlers, trappers, traders, and Native Americans, correct?
A. Correct.
Q. So there are a number of explanations, and we're not going to go through all of those again as to why the river might not have been boated, correct?
A. Correct.
Q. But you also rely on historical accounts in newspapers as well as in books about the navigability of the river pre-statehood?
A. That is correct.
Q. And some accounts show successful trips and other accounts show somewhat or even total failure of trips, correct?
A. Correct.
Q. And when we rely on newspapers, sadly, there are murders that take place, burglaries and robberies that take place everyday in Arizona, and they don't always make the newspaper or certainly aren't on the front page to be reviewed by historians. Would that be a correct statement?
A. There are lots of things that happen that

don't end up in the newspaper, correct.

Q. And when regular and ordinary things take place, sad to say that sometimes even murders or high-profile things that we view as extraordinary take place, when they become the usual or norm, they're often not regularly covered or reported unless somebody makes an effort to call attention to themself. Would that be a correct observation?

A. Dog bites man; man bites dog. One of those is news.

Q. And when we talk about 27 years to figure out the Missouri River, that doesn't mean that people couldn't and weren't floating boats down the Missouri River before they got that figured out to find out the best means of transportation down that river, correct?

A. That's correct. It's with regard to a specific type of boat use.

Q. And Lewis and Clark, I believe, took about 40 some folks down the Missouri River, at least to the Great Falls area in a keelboat; and a keelboat has a long portion of that boat that digs deep down into the water, correct?

A. That's my understanding, yes.

Q. And a keelboat isn't exactly an ideal boat to take down the Missouri River, correct?

A. Not that I'm aware of.
Q. And you couldn't take a keelboat down the Gila River, could you?
A. Not during -- not in portions of it.
Q. And you don't know whether or not the Special Master that relied upon the evidence presented to him in the 1931 Utah case was a hydrologist or a boater, do you?
A. I do not.
Q. And you don't know the extent to which experienced boaters may have presented evidence to him during that hearing?
A. I do not.
Q. And you're not aware of the extent to which hydrologists might have presented evidence to him either, are you?
A. No, I'm not.
Q. Now, have the fields of hydrology and geomorphology changed significantly in terms of education and technology since the 1930s?
A. Yes.
Q. And certain basic principles of flow and dynamics are the same today as they were before?
A. Water still goes downhill.
Q. But the techniques to investigate, for

example, the effects of groundwater or whether it's percolation taking away flow from the river or underground flows back into a river or surface flows into a river, the techniques for measuring those things have greatly improved since the 1930s?

A. We have many new tools, and many of them are better.

Q. And you would agree that while you have information, historical information that tells us that steamboats were used, as you said for a period of about 20 years from about Dome to Yuma or about 20 miles of that river, you couldn't take a steamboat on the upper Gila, correct?

A. That's my opinion, yes.

Q. But that doesn't make the upper Gila nonnavigable, right?

A. It does not.

Q. And the upper Gila Segments 1 through 3, as you characterized in these proceedings, is currently navigable?

A. Correct.

Q. And I think you also said that the median flow rate of the Colorado is similar to the Gila as a whole. Was that a correct statement?

A. It would be higher, but similar.

Q. And the Colorado River flows were higher at least during certain times of the year or various segments of the Colorado. That doesn't mean that the Colorado River throughout its course is deeper than the Gila River throughout its course in its ordinary and natural condition, does it?

A. Not necessarily. But there are certainly parts of the Colorado River that are deeper than parts of the Gila River.

Q. And Segments 1 through 3 of the river or the upper Gila do carry more than six inches of water as their median, ordinary and natural flow; is that correct?

A. That's correct.

Q. And while you might be able to get through a riffle that's two inches deep in a canoe, if the entire depth of the Gila River or a segment of it is only two inches, are you likely to be going down that recreationally, commercially or otherwise?

A. Probably not recreationally. And probably not commercially. I would not consider it to be a navigable river at that depth.

Q. But two inches is way below the ordinary and natural flow of the Gila River in each and every one of its segments; is that correct?

A. Yes.
Q. And again, that 1998 criteria report that we referred to that says rubber boats, not real common until the 1940s, that report to a large extent is no longer viable. Would you agree with that, at least from a legal perspective?
A. Many of the presumptions that that report addressed have been struck down.
Q. But again, one historian might conclude one thing and another historian another, but you are at least aware of one incident in which a pre-statehood rubber boat was floated or likely floated down the Gila River?
A. A pre-statehood rubber boat? No.
Q. I just wanted to make sure that I didn't misinterpret or misunderstand anything.
At Page 60 of your report on boating, you list various populations. Correct?
A. Correct.
Q. But even if that doesn't reflect the 5,000 or 8,000 Native Americans that may have been in Arizona -- and I don't remember the precise numbers -- we didn't have large cities where manufacturing was taking place in 1912, correct?
A. No, that was slide 61, by the way.

Q. Okay. Slide 61. And Arizona, at least when native cultures were living along the river like the Hohokam -- and the Hohokam were largely in the middle Gila area?

A. Yes.

Q. Which would be Segments 5 and 6?

A. Yes.

Q. And from everything you've read and you've previously testified, they established agricultural communities along various locations throughout those segments of the Gila, correct?

A. It would be Segment 6 would be more accurate.

Q. Okay. And the history suggests that they were largely nonnomadic tribes that were living off of their seasonal agriculture, correct?

A. Correct.

Q. And in order to be able to fill up two hundred miles of canals with water and to have seasonal agriculture, you'd have to have pretty much a perennial flow of water, would you not, within that segment?

A. Perennial or flowing in the correct seasons and in significant amounts.

Q. And both the Daniel Ball Test, and as it is reiterated in the PPL Montana case -- and again, PPL Montana does confirm that the test for navigability is

the Daniel Ball Test, correct?

A. Correct.

Q. It just says you need to take a look at individual segments of the river, particularly if their hydrology or geomorphology significantly varies from reach to reach or segment to segment?

A. Correct.

Q. And again, even with about a thousand years or more of sustained agriculture by the Hohokam and successor tribes along that middle section of the Gila, would you consider those diversions at that time to be material or have substantially affected the natural condition of the river?

A. I think they would deplete the flow in the river to some degree, but certainly not to the degree that the Anglos did when we got here.

Q. And from about 1860 through the present, there has been a continuing depletion of water from those river courses, correct?

A. Correct.

Q. And also, there has been a depletion of water from the streams and groundwater that might in the natural condition replenish those rivers?

A. That's correct.

Q. What's your understanding of Daniel Ball as

reiterated or reflected in PPL Montana as to whether or not every segment that we're talking about would have to have navigability twelve months a year, year in and year out?

A. It's my understanding that they said that it was not required that it be 365 days a year or that every segment of river be navigable.

Q. And there might be some segments in Arizona, particularly the lower Gila, that might on occasion in the ordinary and natural condition have gone dry because of a lack of precipitation, correct?

A. Lack of flow? Or lack of precipitation?

Q. Lack of flow.

A. Lack of flow. And I would characterize that would be more likely in Segment 6 than other segments.

Q. And why is that?

A. It's a losing stream, and by the time you get to the end of Segment 6, it receives a significant boost in flow from the Salt River and its tributaries.

Q. And prior to statehood in 1912, one of the reasons that the Roosevelt Dam was constructed was because the water that was available to ranchers and farmers along the Salt River had already been overallocated. There wasn't enough to nourish those crops and livestock.

A. The function of the dam was to regulate the flow of water to better meet the needs of the water users.

Q. And the result of the damming of the Gila River -- excuse me, the Salt River, that occurred at or before statehood, correct?

A. On the Salt River, yes.

Q. And since that dam has been constructed, and now three subsequent dams along the Salt River, there is almost no flow except when releases occur because of anticipated floods or the need for agriculture. There's almost no flow down the Salt River at the confluence of the Gila, correct?

A. Correct. Well, there's no flow from the upper watershed. The flow is directly down the riverbed to that segment of the river.

Q. And there may be effluent that gets down there?

A. There's effluent. There's some irrigation return.

Q. And that's the other thing, too, is that more likely than not the irrigation returns, when we had Native Americans and early settlers that were diverting water to croplands that were adjacent to the river banks, to the extent that those waters were not absorbed

by crops or used by plant growth or evaporated, that water would flow back into the river, correct?

A. Yes.

Q. But when you set up a diversion dam, and that doesn't allow water to, in its natural way, to flow down the river, you could end up creating a desert-like condition in that river bottom that wouldn't be ordinary or natural?

A. I think as a result of the diversions, the existing -- the remaining channels look significantly different than their ordinary and natural condition.

Q. And we talked about the Segment 6 portion of the river through the Indian reservation. That when you drive over it on I-10, it looks hardly different, if at all, than the natural desert, correct?

A. I would say to the casual observer, yes.

Q. But you had Pattie's observations that there were large stands of cottonwood and willows within that segment, correct?

A. Pattie and the other folks as well.

Q. And also an observation that Native Americans were engaged in fishing?

A. Correct, throughout the year, supposedly.

Q. Throughout the year, and that there were large fish in the river, correct?

A. That is correct.
Q. And if you have a desert, you're going to have large fish living in it?
A. Generally they prefer water, yes.
Q. And you have had a chance to review Mr. Weidman who works at Game and Fish, his declaration?
A. I did.
Q. And he talks both about fish and the requirements that are necessary in a river system for there to be large, sustainable populations of fish?
A. Yes, and I relied on Mr. Weidman's declaration and information that I developed.
Q. Do you think it would be helpful to this Commission to take a look at Mr. Weidman's declaration? We're not going to call him, in order to save us at least a little bit of time, but do you think that that's helpful to you and would be helpful to all of us to read and understand it?
A. I would certainly encourage the Commission to consider that document. I'm hoping I don't have to sit here and read it out loud.
Q. Okay. We're not going to have you do that unless somebody else wants you to. But we do have also information in that Weidman declaration.
MR. KATZ: And, Joy, I don't know what number

that is, if you know, but it's probably X020, and then a tab, and we'll get that in the record momentarily.

BY MR. KATZ:

Q. But he also talked about beaver, correct?

A. He does.

Q. And he largely concludes that in the Gila River system we would largely be dealing with bank-dwelling rather than dam-dwelling beaver, correct?

A. Yes. His observations as a Game and Fish specialist are very similar to Mr. Farmer's and my own observations of the river, not seeing beaver dams, but seeing bank-dwelling beaver.

Q. And there are beaver signs and beaver that you've seen on your various trips down the Gila?

A. Absolutely.

Q. And again, you've never hit a beaver dam that's been an obstacle to your navigation?

A. I've never hit a beaver dam on the Gila.

Q. And while you could build a dugout canoe out of cottonwood trees, is that the ideal material for the construction of dugout or any other type of wood canoe?

A. I would say a dugout canoe is not the ideal construction. You could build one out of a cottonwood; you could build it out of other trees as well. Cottonwood is obviously a relatively soft wood.

Q. There was a big deal made when Mr. Hood cross-examined you that you weren't aware of ore or other -- well, supplies going into the mines by way of boat or quantities of ore coming off the river.

Would it be practical, even if the -- I mean, assuming that they're even larger than in ordinary and natural -- well, let me rephrase that.

Taking a look at ordinary and natural flow down the river, could you get a large barge or a steamboat or some other bigger than a small craft type of boat down there to transport tons of ore even if the river were in its ordinary and natural condition?

A. Not reliably.

Q. And does that mean that you couldn't do other things, such as deliver mail or goods between communities if there were sufficient population and need?

A. No, my opinion is that anything you could do in a small low draft boat, you could do on the Gila River in its ordinary and natural condition.

Q. And the Daniel Ball Test, as reiterated in Defenders, and the Utah case before that, and in PPL Montana, doesn't require that there be boating both upstream and downstream, correct?

A. That's correct.

Q. And as you indicated, there are sometimes better means for the transportation of large loads, particularly in open country, in wagons or later on by trucks or cars, correct?

A. Or trains, true.

Q. And by the 1870s to early 1880s as the population started to boom and the diversions continued to increase, there was significant reliance on railroads that could take you all the way from here to California?

A. Indeed.

Q. And also from here to the Baja Peninsula if you wanted to put something on a large ocean-going boat or vessel. In other words, was there a railroad that you could take?

A. I don't know out to Baja, Mexico.

Q. Okay.

A. But certainly to California and ports there for sure.

Q. Okay. Now, again, if you boat down a river, whether it's for recreational purposes, be it for commercial purposes or not, or you're boating to deliver mail or goods, lumber, whatever the case might be, do you usually secure that load?

A. Yes, you do.

Q. And if it's susceptible to being destroyed by

water in the event of a capsize or tipover, even if it's secured, were there means at the time of statehood to prevent that load from getting wet, even if not as sophisticated or technologically advanced as today?

A. Yes, there were.

Q. And again, I asked this a number of different ways. But the Gila River today, at least Segments 1, 2, 4, and 5 with the diminished flows are, in fact, navigable in fact?

A. Oh, yes.

Q. And if you added the water back into them at the time of statehood, we would have navigability in fact, correct?

A. Still would, yes.

Q. You were questioned to a large extent about whether or not you had read Pattie's original diaries or journals, correct?

A. That's correct.

Q. And you then talked, I think, about the daisy chain. But we have a couple of books, including a Brown book or study, and other pieces of evidence that were admitted in the 2005 hearing that have quotations from Pattie, correct?

A. That's correct.

Q. And those quotations that are in your revised

report of 2003 or that you testified to previously and at Page 21, I think, of the Davis thesis, Pattie wasn't just dealing with the upper Gila, correct?

A. That's correct.

Q. And you are convinced that there are multiple resources or sources of information before this Commission that tell us that Pattie took several trips between Safford and Yuma in the 1820s, correct?

A. Some historians have reported that that was his testimony.

Q. And you were asked about the Gila River above the San Francisco in the valley that existed there. You, I believe, testified that by 1901 most of the Gila River Valley had been diverted for agricultural purposes; is that correct?

A. I'm not sure I testified that -- you're talking about the Duncan Valley that most of the water had --

Q. That might be. But I'm talking the river above the confluence with the San Francisco?

A. Yeah, that would be the lower part of Segment -- the upper part of Segment 2 and all of Segment 1, and there were significant diversions in there that particularly lowered the low flows.

Q. And as I'm going through my notes, I'm

skipping over a lot of these slides that we could go through a second time. I don't want to do that.

And again, at the original or the 2003 testimony by Ms. Tellman and her portion of the revised report, she reports that Pattie canoed that several times from Safford to Yuma, and she cites Davis's master's thesis, correct?

A. That's correct.

Q. And take a look at slide 152 of your Gila report, if you would. Your report uses median flows, correct?

A. That's correct.

Q. But Mr. Burtell, is it, that he was using mean flows?

A. No, he was reporting median flows.

Q. And if you used a mean flow, that would be exaggerated either up or down based upon whether you had long periods of drought or flood, correct?

A. Typically in Arizona the mean is higher than the median.

Q. And that's -- go ahead.

A. I just recall that there were some errors on this slide that were pointed out earlier.

Q. Oh, on 152. Joy reminded me, and my notes are reminding me now, that you put -- that there were a

couple of errors in that slide. What are the errors, and does it make any difference with respect to your ultimate conclusion?

A. Apparently on a few, a number of these I copied down the velocity rather than the depth. In those cases the numbers that I reported are slightly higher than the numbers that Mr. Burtell actually reported, but they're still higher than the threshold of boating that we're using.

Q. Will they show median flows throughout most of the Gila above six inches?

A. Well, this slide right here is not so much about the median flow, but is the depth --

Q. Okay.

A. -- relating to those median flows.

Q. And the depth is more than six inches?

A. Yes.

Q. Even if you corrected Mr. Burtell's numbers, would the depths average or median depths be greater than six inches?

A. Yeah, and that's for the lowest flow month that he reported.

Q. And were they generally more than -- they were somewhere between a half a foot and a foot at the lowest levels?

A. Yeah, the lowest was a half foot, as I recall. No doubt, we'll hear more on that.

MR. KATZ: I'm going to have Joy ask a couple questions she wrote down rather than my having to read her writing, and then I'll get back to my --

MS. HERNBRODE: I do resent the implication in the record that I have bad handwriting, but we'll move on from that.

REDIRECT EXAMINATION

BY MS. HERNBRODE:

Q. Jon, do you carry a GPS, cell phone, first-aid kit or similar devices when you run a river?

A. Sometimes, but not always.

Q. Are those devices absolutely necessary?

A. Besides GPS, the first-aid kit caught my ear. And I don't remember the rest.

Q. Cell phone? Repair kit?

A. The only reason I bring a cell phone is because I don't want to leave it in the car.

Q. You take them because it's prudent to take advantage of modern technology, not because you can't boat without them?

A. Yeah, it's pretty nice. I put on my seat belt now, but I could drive a car without it. It doesn't

affect the drivability of the roads that I'm on.

Q. Same for helmets?

A. Oh, yeah.

Q. Can you use a river if you don't have USGS gage data?

A. Oh, absolutely.

Q. So you don't have to -- you can plan a trip even though the USGS gage data doesn't tell you, for example, what the river level is going to be this August?

A. Yeah, if you're familiar with the river, you can go out there and you boat it. Sometimes it's nice to know what you can expect, but it's not a criterion.

Q. It's prudent to take advantage of modern technology, but not necessary?

A. Sure.

Q. All right. Mr. Hood asked you about the sources for at least one of your Pattie slides, and you didn't quite have an answer for that.

Is the source of that slide Barbara Tellman's Arizona's Changing Rivers at 98, which is Exhibit 001, Part 18, and Doug Brown's Man and Wildlife at Page 19 through 20, which is Exhibit X004, Part 3?

A. I believe so.

Q. And is Brown's Man and Wildlife different than

Goode's thesis?

A. I believe, yes, it is, different document.

Q. Okay. And I just -- Mr. Katz wanted the Small and Minor Watercourses exhibit, and that is Exhibit No. 1, Part 23, and Mr. Weidman's declaration is Exhibit X012, Part 73.

FURTHER REDIRECT EXAMINATION

BY MR. KATZ:

Q. Now that I've re-collected myself, a few questions that were written down by me and my colleagues rather than in my notepad, but the presence of ferries during a period of, significant period of years prior to statehood, would demonstrate at least at that time that the river was susceptible to being navigated by boats, a portion of the river was subject to being navigated by boats larger than a canoe?

A. Yeah. Yes.

Q. But traders and trappers regularly used, throughout the western United States, canoes for trading and trapping, correct?

A. That's correct.

Q. And they did so in the midwest as well. Fur trade was centered or based in St. Louis, correct?

A. Yes.

Q. But a lot of that beaver was harvested from the western and southwestern United States?

A. Rocky Mountain states, yeah.

Q. Would you recommend that a novice boater boat the Colorado River through the Grand Canyon?

A. Depends on how well I liked them.

Q. But during normal portions of that river that are pretty treacherous during normal flow, correct?

A. Yeah, I would say novice boaters, unless they're really quick learners, that's not the place for them.

Q. But just because some farmer, rancher or an idiot like me gets into a boat on a river that I've never seen before and maybe puts myself at risk or in danger doesn't make the river nonnavigable, correct?

A. That's correct.

Q. And even though a novice like me shouldn't go down the Colorado alone, and maybe even with you, I wouldn't have any trouble determining that the Colorado was navigable, because it's already been done for me, correct?

A. It's been done.

Q. And again, with respect to Segment 4, and that's the segment that goes up to the Coolidge Dam, correct?

A. Or down from it, yes.
Q. Or is it the one that goes --
A. It's below.
Q. It's below.
A. Yeah.
Q. And there are substantial agricultural diversions that occur above the dam?
A. Yes.
Q. In Segment 3, we've already discussed that?
A. Yes.
Q. And that would cause the flows down Segment 3 to be lower than natural and ordinary, correct?
A. Yeah. Again, we spent some time there that there's a change in the seasonality of flow in Segment 4 due to the operation of the dam. Overall, I want to say the flows are lower than what they would have been in the ordinary and natural condition.
Q. And when we talk about dams stabilizing the river conditions, we're talking about stabilization or predictability for agricultural purposes, not for navigability purposes, correct?
A. They're not operating the dam for navigability, no, if that's what you're asking.
Q. And when there were reports of erratic flows down the river, that might be erratic in terms of the

predictability of water availability for agriculture but not necessarily predictability of water for navigation, title navigation purposes?

A. The river in its normal condition under normal parameters is navigable downstream there.

Q. Have you encountered any boulders in the -- in your experiences down the Gila River that affect the river's navigability?

A. I've encountered many boulders but none that affected navigability.

Q. Have you destroyed any boats or capsized because of the presence of those boulders?

A. No.

Q. And are they usually fairly easy to observe, either by looking at the water flows or the river channel itself?

A. I think even the most novice boater can see the boulder coming, whether he can do anything about it is the skill level.

Q. And again, there's a difference between flying a fighter plane and a Cessna 180?

A. Yes, there is.

Q. And there's a difference between driving your car to and from work and driving a multi-ton semi tractor-trailer, correct?

A. Yes.

Q. Have you ever run into on the Gila River -- you've described compound channels -- any meandering or braiding that's been an obstacle or, as you put it, an obstruction to your ability to navigate that segment of the river?

A. I have not.

Q. And even if there isn't a reliable history of trade and travel on the Gila River prior to February 14 of 1912, does that change your opinion as to whether or not the river at earlier dates prior to then was navigable in its ordinary and natural condition?

A. Just to be sure I caught the question, did you say if there was not a history, any historical accounts?

Q. In other words, even without having the history in front of you, from the gage data that you reviewed, from the gage data that other hydrologists in this case have reviewed and analyzed, and from your perspective, was this river navigable in its ordinary and natural condition even if you didn't have historical events to confirm it?

A. Well, there were historical events. I did include those. But had there not been, I think based on the scientific and hydrologic and geomorphic data, my conclusion would be -- and my own personal experience

boating as kind of a ground truth to all of that science -- yes, the river is navigable.

Q. And there have been some that have suggested if a segment of the river is flooded for months on end, is that an ordinary condition?

A. If it's flooded for months on end?

Q. Yes.

A. I think that's kind of opposite of the definition of flood. But I would call that high flow condition. So I'm not liking the question, to tell you the truth.

Q. Okay. Well, we had reports of flooding in the 1890s and around 1905 that changed the characteristics at least of the floodplain, correct, along the -- would it be within the entire river or largely downstream?

A. The flood occurred on the entire river --

Q. Okay.

A. -- and as a result of those floods there were segments that experienced changes to the floodplain.

Q. And did those segments experience any significant changes to their flow channel?

A. To the low flow boatable channel?

Q. Yes.

A. None that I'm aware of.

Q. And from time to time, whether it's the

Colorado River, the Gila River or the Salt River, the central or low flow channel because of naturally occurring floods and droughts may change its position, correct, within the banks of the river?

A. Yes.

Q. But that doesn't mean that it doesn't remain navigable throughout most of the year post those conditions, correct?

A. All rivers change to some degree all the time.

Q. And if a segment of the river were dry for some of the summer months, for a month or two, on occasion or even regularly, would that make that segment nonnavigable according to PPL Montana or Daniel Ball?

A. Not if that's the only fact; all other things being equal, no, that would not.

Q. And again, in today's condition, the Gila River, the Segment 6, 7, and 8 are not only losing water from the Salt, they're losing flow from the Verde which has also been dammed at two locations?

A. The Verde water comes in through the Salt, yes.

Q. And you were asked if you had done an evapotranspiration study. Would that make any difference to you with respect to your ultimate conclusions in this case?

A. It doesn't make any difference to my opinions, no.

Q. And let me just take another look at my notes.

I think that I have one final question. I can beat the dead horse further but I don't want to get anybody upset anymore than they already might be.

But again, do you believe that on February 14th of 1912, that the Gila River along its entirety was susceptible to being used in its ordinary and natural condition as a highway for commerce over which trade or travel were or could have been conducted in the customary modes of trade and travel on water?

A. Yes.

Q. And again, when we talk about customary modes of trade and travel, that's the type of boats that were available at the time, correct?

A. Correct.

Q. And there's nothing in there -- and we were talking about it being used as a highway of commerce. The case law says there's no requirement that the trade and travel be for commercial gain, at least in Arizona, correct?

A. Correct.

MR. KATZ: I'm done.

THE WITNESS: That one question had four

parts, just for the record.

MR. KATZ: Okay. Do you want to answer it four times?

THE WITNESS: No.

CHAIRMAN NOBLE: Mr. Katz, do you have any other evidence or witnesses that you intend to present?

MR. KATZ: We will confirm with the Commission and with George that all of the exhibits that we have tendered to the Commission have been properly received and identified. But at this time, we don't intend to present any other witnesses for our case in chief and would rest that case subject to confirming the exhibits have been received.

CHAIRMAN NOBLE: Mr. Fuller, we appreciate your time and your effort. We ask you to sit down because now it's our turn.

THE WITNESS: Oh. Do you want me to turn the presentation back on?

CHAIRMAN NOBLE: Yes.

THE WITNESS: Sorry about that.

CHAIRMAN NOBLE: Mr. Allen.

EXAMINATION

BY COMMISSIONER ALLEN:

Q. When the question was asked by Mark regarding

the conditions of the San Pedro immediately adjacent to its confluence with the Gila, you made the comment that you didn't think that the navigability question was pertinent or were you implying that there may have been some navigability potential up the San Pedro where its confluence with the Gila occurs, or not? Because that applies to the Agua Fria and to a number of other rivers such as the San Francisco.

A. It wasn't my intent to make any implication about the navigability of the San Pedro River at all by that answer.

In all likelihood, the backwater from the Gila River in its ordinary and natural condition probably would extend some distance up the San Pedro River. However, my guess, not having studied this in detail, my guess is it would be within the floodplain limits of the Gila River. Not a significant distance at all. But again, that's my guess having not studied it.

Q. Okay. The distance up the Gila River from its confluence with the Colorado, you've indicated is some 20 miles or possibly up to Dome?

A. The Segment 8 distance?

Q. Yes.

A. Yes.

MS. HERNBRODE: I'm sorry, Commissioner Allen,

could you use your microphone, because even I'm having a little trouble hearing you.

CHAIRMAN NOBLE: It won't do any good.

MS. HERNBRODE: Oh, okay. Never mind then. I apologize.

MR. KATZ: That's just for recording.

BY COMMISSIONER ALLEN:

Q. The location at Dome where there is apparently flow substantial so that a steamboat could float, could move back and forth in that area, is that not controlled basically by bedrock structures that bring the Gila River to the surface at that particular point?

A. I think I was asked this question yesterday. It's all running together here. I recall having that question, and I recall my answer as being I don't know specifically. I did not study whether the bedrock is bringing flow up to the surface at that point. There is a bedrock range that the river goes through so it's certainly possible there.

Q. Okay. In Tom Murphy's questions, there was some implication that the State might not actually own the bottom of the bed of a navigable river where a reservation was concerned or where the Feds had withdrawn land. Your feeling about that?

A. I've heard that argument. Advanced for the

Salt River. And it seems to me to be more of a legal question than a technical question. So I'm not going to offer any expertise on that.

Q. Well, the problem is that we just heard Mr. Katz say that -- and I would like to quote specifically what he said -- something about navigability in fact does imply navigability as a result of law. That's not exactly what you said, but that's close.

How do you resolve the question of the surveys that will be presented subsequently and have been submitted as evidence in regard to the question again that I asked about the ownership of the bed of the channel in a reservation or where land have been withdrawn?

A. I guess, Mr. Commissioner, I would say -- I would approach it this way. What I've been tasked to do was determine navigability. What are the flow conditions, can it take a boat, can you take a boat down there, what kind of a boat, what season of the year, what would be the nature of usage for boats; and based on those studies, I'd say yeah, you could take a boat through, regularly through the reservation areas.

If that decision is -- if the Commission concurs with that, then the next step is to figure out,

okay, what boundaries does the State actually own and whatnot. So I think that's following on after.

So I don't know that it affects the navigability in fact part of it. But you're right, it may have implications for the navigability in law as to whether it was the federal government's to give away to the State on February 14, 1912.

Q. You made one other comment about the median flow of the Colorado River and the Gila being similar.

A. Yeah, similar.

Q. How similar is similar?

A. That depends on where you are on the Gila. Clearly the median flow rates in the upper Gila are much less than they are near the mouth. Near the mouth, the Colorado River -- the Gila River is likely to have a lower median flow rate than the Colorado River.

It's hard to find data on the Colorado River that pre-dates Hoover Dam. So understanding exactly what the ordinary and natural median flow of the Colorado River is more of an inquiry than I wanted to do. It would be lower.

Q. Okay. There was also some testimony given about Pattie in 1825, and a comment was made about there being plenty of beaver. That was the quote. And my question is, was he talking about the San Pedro or was

he talking about the Gila at this particular point in time? Because the other comment that was made was that there was -- they had real problems. They ate the dogs and the horses or whatever they could get their hands on when they were on the Gila but not necessarily on the San Pedro. So I'm a little confused about where he was referring to with regard to beaver.

A. I know that he did trap on the beaver -- he said he trapped on the Gila. That specific comment I'm not exactly sure where he's referring to. I can point you to my own observations. There are plenty of beaver still on the Gila.

COMMISSIONER ALLEN: I think that's all I have, Mr. Chairman.

CHAIRMAN NOBLE: Mr. Horton, do you have any questions?

COMMISSIONER HORTON: No, I don't, Mr. Chairman.

CHAIRMAN NOBLE: I have one. Does anybody know where Henness went?

COMMISSIONER HORTON: He had to be excused.

CHAIRMAN NOBLE: Okay.

Thank you, Jon, very much. We appreciate it.

Do you have -- you're sitting there for a reason or --

MR. HOOD: To hear.
CHAIRMAN NOBLE: Ah-ha.
MR. HOOD: Yeah.
CHAIRMAN NOBLE: Okay. Then you're excused.
THE WITNESS: Thank you.
MR. SPARKS: I would like to make one comment off the record about Mr. Katz's background on rivers.
CHAIRMAN NOBLE: Off the record.
(Discussion off the record.)
CHAIRMAN NOBLE: Mr. Gookin is up next. Okay. While they're setting up, I'm sure it will take more than ten seconds. Okay. We are going to go until 4:30. Gary, we're going to give you a five-minute break.
(Recessed from 3:37 p.m. to 3:45 p.m.)
CHAIRMAN NOBLE: Just as Mr. Murphy sits down, it's our intent to go as late as possible -- I'm sorry, as late as necessary on Friday evening up until midnight. And we will go late tomorrow night, too. Today is Wednesday. We will go late tomorrow night and again on Friday night unless it becomes really obvious that we won't get through until 2015. So we'll probably go until about 8:00 tomorrow night, and we will look forward to going late again on Friday night, if necessary.
Hi, Mr. Murphy. You got quick questions?

MR. MURPHY: I'll see what I can do in the interest of not going till midnight on Friday.

ALLEN GOOKIN,

called as a witness on behalf of the Gila River Indian Community, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. MURPHY:

Q. Could you please introduce yourself?

A. My name is Allen Gookin. I'm a registered professional engineer, employed as a consultant by the Gila River Indian Community in this hearing.

Q. How long have you done work on and around the Gila River?

A. Since 1974.

Q. And you also have a family connection beyond yourself to the Gila River?

A. Yeah, my father started working with the San Carlos Irrigation and Drainage District, which is a major user on the Gila River in 1953.

Q. And I know your resume is part of the record in this matter, but could you just briefly describe for the Commission some of your specific experience in working on the Gila River?

A. Well, primarily it's been related to Globe Equity No. 59, which is also known as the Gila Decree. I read it first time in 1974. I've testified numerous times in front of the Federal District Court on it. I am author of -- the primary author of what's called the call system which administers the water distribution of the Gila River that has been approved by the Federal District Court.

Q. And what, in terms of the entirety of the Gila River, what portions of the Gila River have you physically examined over the years?

A. Using Mr. Fuller's terminology, I have physically been in Segment 1, Segment 3, Segment 4, 5, 6. The upper portion of Segment 7. I've been in Segment 8, but I was too young to care what I was looking at.

Q. Now, as part of the Community submission for this proceeding, I asked you to prepare a report, correct?

A. Yes.

Q. And that report has been tendered for the Commission?

A. I sure hope so.

Q. And with regard to your report, what did you do, generally?

A. Generally, I looked at the river in several reaches. I looked at what the changes in the channels had been. I estimated what the flow would have been in those reaches under what's called virgin conditions, pre-depletion conditions; and I went through and using some contemporaneous materials, I computed the depths of water that would occur. I also went into a bit more detail on the lack of boats for the Hohokam or Hohokam, I should say. The Akimel O'otham and Pee Posh, and a few of the earlier historic accounts to see if there was a historic record on navigability. Between all of that, I concluded that the Gila River was not navigable in its ordinary and natural condition as of February 14, 1912.

Q. Let me ask you specifically about the channels and the conditions of the channels on the Gila River as of 1912. As of 1912, was the Gila River's channel condition braided?

A. For the most part.

Q. And when you say for the most part, could you be more specific?

A. Well, I found one reach on the Gila River on the reservation that I did a cross section for where it wasn't braided; and other than that, from what I've read and researched, I think it was braided most of the rest. I'm sure there are spots where it was down to one

channel, but I haven't mapped where. Mostly there were multiple channels.

Q. Now, the primary focus of your report was what Mr. Fuller labeled as Segment 6, right?

A. Yes.

Q. And why is that?

A. You're paying me to do this.

Q. That's the segment that encompasses the Gila River Indian Reservation, right?

A. Yes.

Q. Now, when you say braided, can you explain to the Commission what you mean?

A. Well, Mr. Fuller and I have a different idea of what braided means. A river in Arizona when it's braided, normally does not have one major channel and then a floodplain and then overflow channels that are elevated above the floodplain as Mr. Fuller's diagram, which is shown on the screen, indicates. Usually there are several low flow channels, and then the floodplain, and then the other levels higher up. When I say several low flow channels, there's really going to be a lowest flow, a lower flow, a low flow, and a, possibly a maybe not so low flow before you get into the so-called floodplain.

This cross section that I am showing is from

the Army Corps of Engineers, a Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States. I've also been out in the field numerous times walking various reaches. And, for example, one time in Segment 3, I was out in the river. I crossed a dry channel, went over a small little island to look at the river, and by the time I turned around and got back, I could see the water had risen just enough that it was just beginning to come down this channel I had crossed that two minutes ago was dry. It was not a flood. It was not even a very high flow. Now, I was stupid. I stood there and watched it till it got the channel wet, and then I tried to cross it, which led to a lot of mud in places I didn't want. But that's a whole separate topic.

Q. So in looking at a river channel then, what would be the relative difference then in the depth of the low flow channels? Are these all going to be the same depth? Is one going to be slightly lower than the others? Is there going to be a lot of variance?

A. There's going to be a lot of variance in cross sections as to exactly how they line up. But usually they're not going to be very far apart in terms of

depth.

Q. Let me -- going back then to the Gila River at the time of statehood, we know that the flows at the time of statehood were not in their ordinary condition. What about the condition of the river channel at the time of statehood, would that have been in its natural and ordinary condition?

A. Yes. The floods that created this situation which occurred in 1890, '91 and '05 -- that's 1905, I'm showing my age -- created the braided configuration that predominated. There were some braided reaches before those floods, particularly in Segment 7, but the major braiding occurred after those floods. The floods occurred just because it rained. Well, excuse me, in some cases it snowed, too, but --

Q. With regard then to flooding events, would it be a fair characterization to say that even if flooding is not an ordinary event, the consequences of flooding on the river channel and the condition in which it leaves the riverbed becomes the ordinary condition of the river?

A. Well, the ordinary and the natural. This is part of the process of nature.

Q. And how, in terms of navigability then, how would braiding of a river channel affect navigation of

the river?

A. It lowers the depths.

Q. And how much would it lower the depths by, or is that variable?

A. That's variable depending on how wide the channels are, how the flow divides, a whole bunch of factors. But the more channels you have, the lower the depth for a given flow is likely to be.

Q. Now, with regard then to -- and when a flooding event occurs and there are consequent effects to the river channel, how long will those effects last?

A. In the arid southwest, they usually last for several decades, perhaps even longer, and I have numerous sources in my report supporting that contention.

Q. And are those changes -- well, let me just go ahead and move on here then.

So at the time of statehood then, we have the Gila River in this braided condition. What did you do with regard to your report as far as determining what the flows would have been in the river's natural and ordinary condition at that time?

A. I went through numerous sources. I primarily relied on a book that I call the White book, primarily because my father called it that before me, and you can

recognize it. It's in the green binder on my desk.

The White book was by the Bureau of Reclamation. They did several editions. They did a 1952, '53, and '58, and I have them all bound together. It was an accounting and a preparation by the Bureau of Reclamation to determine the virgin flow at various gages on the lower Gila -- or lower Colorado River and its tributaries.

Q. In addition to the Bureau or White book, what other sources did you review in putting your report together?

A. I looked at the Southworth report, which was a report prepared by a Mr. Southworth of the -- I think it was the Office of Indian Affairs, the predecessor of the BIA, Bureau of Indian Affairs, as a part of trying to get Coolidge Dam, Ashurst-Hayden Dam authorized. It's a very detailed history, and he did include some flow estimates and some flow, very early flow data as to gains in the river and so forth. I looked at -- well, the report shows the sources. Those were probably my two most important.

Q. So you've got the figures and the information from those sources. What did you do with it?

A. Well, as a part of the Southworth report, he sent out some underlings headed primarily by

Olberg -- who Olberg Bridge is named after -- and they surveyed using what's called a plane table up the river quite a ways, actually, but I used the portion of the survey that was in number, Segment number 6.

Q. Let me stop you at this particular point. In your report, you broke the Gila River into six discrete segments, right?

A. Yes.

Q. And what were the segments that you divided the river into?

A. The Duncan Valley, which Mr. Fuller called Segment 1. The Box Canyon, which he called 2. The Safford Valley, which he called Segment 3. I called Segment 4 and 5 jointly the Kearny Reach, because I was trying to come up with a name. I didn't know what else to call it, primarily. Segment 6 is normally called the, middle Gila River, and that's what I called it.

Q. And that's Ashurst-Hayden to the confluence --

A. Yes.

Q. -- of the Gila and Salt?

A. Yes. And Section 7 and 8, I jointly combined into the lower Gila.

Q. Okay. So going back then to what you did with the information that you gleaned from the White book and these other sources --

A. Using this plane table survey, and let me explain. A plane table, before they had airplanes that were reliable enough to take pictures from, they used a plane table to do topographic mapping and feature mapping. That was the basis of the United States, many of the United States geological survey quadrangles were plane table surveys. It consists of a tripod. There is a piece of wood put on it that you make horizontal by various adjustments, and you screw on a piece of thick paper. I've seen these original sheets from the plane table, and they've got the very distinctive screw marks on them, so you can tell that they came from a plane table. You put a device on it called an Alidade, and you look through it, and it will allow you to see the elevation at the point where your rodman or nowadays rod woman -- but usually back then you didn't -- their location and the distance it is from where you are. And using that, you then put pins in the paper or through the paper, and draw lines between them, and you end up drawing a map while you're in the field. You then take that in and ink it and clean it up and get rid of the erasures and so forth. And that formed the basis that -- we had those from about 1913 to '14, which I figure was pretty close to 1912, that showed the topography of the Gila River in Segment 6, the middle

Gila.

I took two cross sections. I took one in Township 4 South, Range 7 East, Section 17; and since I didn't have a flow measurement there, I went a little bit upstream and I took the flow measurement from Kelvin.

Now, this reach is a losing reach, so it's probably a little generous to use that. I solved the equation using Manning's equation, and I computed the depths for low flow, median flow, and mean flow; and those are shown in Figure 5-1 of my report.

I then picked a cross section from Township 1 South, Range 1 East, Section 21, which was pretty near to the Salt-Gila confluence. And it had a very unusual channel. It was very -- almost straight up and down with a bottom that was almost flat. It had a little slope to it. And then it had the floodplain and then it went up from there before you got to the higher floodplain.

And since I thought it was different but representative of about the western third of the reservation, I would say, I did a second one with that.

Also, Dr. Peter Mock, who works for the Community, went down to Tucson and got the USGS to give him the rating curves for the Gila River at Kelvin back

around statehood. That was quite a trick on his part, I might add.

And so I had records from before statehood by -- I don't remember exactly, but by two years or so to a few years after statehood -- so I could see with a given flow what the depth would have been at Kelvin.

Kelvin is a little bit upstream of Segment 6, the middle. It's technically in Segment 5. It usually is used as being representative of the flow at Ashurst-Hayden Dam.

Q. Okay. What --

A. Oh, excuse me, and I computed the depths of flow from it, and I put those in the report.

Q. Now, what I'm showing on the screen here, this is a summary of the results of your calculations, right?

A. That's correct.

Q. And could you just briefly describe for the Commission what your calculations resulted in here?

A. Well, you can see for mean, median, and low flow, the depth is below the flows. And there's the, below Kelvin, which is the one not at Kelvin but a few miles downstream from it where the river opens up, and you have a very wide braided channel back then. Still do, in fact.

The one above the confluence where it seems to be one major channel, that's on the right. And you can read the depths of mean flow, median flow, and low flow.

The flows from Kelvin and the rating gage came in higher. The mean was 1.7 feet. The median was 1.4 feet, and the low was 1.1 foot in depth, and that was primarily because Kelvin is a narrower spot on the river, and so you tend to get more depth.

Q. Now, when I look at this mean flow and depth, does that mean, if I'm looking at a depth of .7 or .98 feet, let's say below Kelvin or above the confluence, does that mean I could expect the flow to be consistently .98 feet?

A. No.

Q. Like every day of the 365-day year I go out, I see a foot of water?

A. No.

Q. Why not?

A. Well, the mean tends, if anything, to overstate what you would find on a typical day. The best indicator of a typical day would be the median. But even there, you're going to have 50 percent of the time or a smidge less more flow, and 50 percent of the time or a smidge less low flow, and that smidge is when it happens to hit it right on.

Q. And just as generally on the Gila River and probably true for other rivers in the southwestern part of the state, are there times of year that skew the mean or the median?

A. Yes. In particular, floods or the snowmelt season will often skew the median -- or excuse me, mean. Mean flow. And that's why when you're talking about unregulated flows, you usually use the median as being the most representative. If you're trying to look at something more reliable, then you go to the low flow.

Q. Just for the benefit of the Commission, these figures also take into account flows that are lost by man-made diversions or dams, right?

A. They are added back in. So this represents the estimates of flow, assuming nobody had lived there, and you just walked in on February 14, 1912, and somehow some spiritual entity handed you the mean flow, median flow, and low flow records. That's what they should be.

Q. Now, Mr. Fuller yesterday indicated that he had an issue with one of the variables that you would plug into Manning's equation, right?

A. Yes. And in fact, he caught me in a mistake but not the one he thought.

Q. Okay.

A. The channels are primarily made out of sand,

and I base that on looking at Mr. Fuller's reports and the soils reports and so forth that were in it. And sand is a very weird substance when water flows over it. It can go through numerous types of behaviors. It can be what's called a ripple, a dune, a transition, a plane bed. There can be standing waves as a result, and there can be what can be called anti-dunes. The Manning's "n" is a factor that you put into, not surprisingly, the Manning's equation. And it accounts for the fact that if water is going to flow over something really, really, really rough, there's going to be a lot more friction than if it flows over glass, say, in which case there's very little friction. And it's been used for over a hundred years.

They suggested that I should use .035, and that is the Manning's "n" commonly used when you're talking about flood control, because the river can go into the dunes phase or the standing waves and anti-dunes, which can give you high flows or higher water elevations; and, of course, in a flood study you want to be the safest you can, so whenever you're in doubt, you kick up the numbers that make it higher.

In trying to replicate it -- I checked a study -- I knew that the value was different at low flow. Unfortunately, most tables of Manning's "n" are

in flood manuals. So I found a report by the Arizona Department of Water Resources that was written by a firm Simons, Li & Associates. Li is L-I. And they had a table and they showed the recommended values for flood studies and for sediment transports.

The sediment transport, I thought, was the most appropriate because that was talking about the more normal flows. I used .020. I don't know why. I shouldn't have. I should have used .022. That means that in the below Kelvin numbers, the depths should be greater in somewhat less than ten percent. .022 divided by .02 is a ten percent mistake, but less than ten percent because as you get deeper, the walls moved outwards. They got wider.

On the one near the confluence with the Salt, that was much more rectangular, so it would be very close to a ten percent mistake. And so you should add ten percent to the depth there. It would not affect the ratings of the reading at Kelvin.

Q. Based upon these figures and taking into account what you just described as your error in the variable that you used, would your opinion be that the Gila River was navigable in its ordinary and natural condition as of the date of statehood?

A. Okay. First it was a mistake. It was not

error. Error is -- means you can't measure things exactly. Mistake means I blew it.

Q. Sorry, my mistake.

A. Okay. It did not change my opinions.

Q. Okay. And what is your opinion regarding the navigability, and this would be of the Segment 6 of the Gila River, as to its navigability in its ordinary and natural condition as of the date of Arizona statehood?

A. I would conclude that it was not navigable, and I base that primarily upon the criteria set forth by the Utah case that at the gages, you really want three feet of depth. If you're going to have these various types of boats that it deemed appropriate in 1896 to navigate the river, and the report has lots of discussion on that.

Q. With regard to gage data alone, what kind of issues are there with just relying on gage data without anything else?

A. Well, gage data normally over -- or it's not representative of the channel itself. Using gage data is great. It gives you a point in the river. But due to the various criteria that go into setting it up, it can create problems, and it doesn't give the same depths that you would expect in the river.

In the case of Kelvin, which is at the end of

5, you have a different value of depth, significantly different than you did when you went downstream a few miles, 10 or 20. And recomputed it because the channel had changed, and the channel will govern the depth.

Q. What's the difference, for example, between the Kelvin gage and the gage just on this side of the San Carlos Dam?

A. It's the Coolidge Dam with the San Carlos Reservoir.

Q. Or the San Carlos Reservoir, Coolidge Dam.

A. The gage right below Coolidge Dam really doesn't give any results that reflect the river because there is what's called a Parshall flume there that was built to take the measurements for the normal releases. It doesn't cover the flood releases which eliminates, I think, nine days out of the history.

But the normal releases go through a concrete structure that is carefully designed to create, have the water accumulate, go down the steep angle, and then flatten out, and it takes a measurement at the, I believe it's at the nape of the water as it goes down. It's a totally artificial depth created by this concrete structure, and not representative of what the channel is.

Q. Physically if you go then and look at the

Coolidge Dam, the gage there, and you look at the Kelvin gage, I mean, how would they look different to the observer?

A. Well, the Kelvin gage, you're just going to see a corrugated metal stand pipe, most likely, sticking out of the river, and it's got something in it to determine what the surface of the water is. So it has very little impact on the flow as the river goes by.

The Parshall flume is a concrete structure that accumulates the flow, and as I said, it then drops it and then levels it out, and it's totally artificial depth evaluations, but it does create a good reading of how much flow there is.

Q. With regard to the depth then of a river at any particular point, what factors are going to affect the depth?

A. Well, if you're going to look at -- first of all, if you have an artificial structure, then you're off into Never Never Land as far as depth goes. The same thing would be of the Olberg Dam. That was at the Olberg Bridge and the Sacaton Dam and the flume. They're all built into one structure. And so you're going over a concrete structure which is going to give you an artificial measurement.

But if you don't, usually the gage is located

at a point where there is what they call a control section downstream. And that helps to keep the sand levels behind it from moving up and down much. And that makes the readings more accurate. But that's different than the wide-open braided channels that you hit in nature, and particularly on the Gila, Salt and so forth a lot of the time.

Q. As part of your report, too, you also reviewed historical accounts of boating within the Segment 6 area, right?

A. Yes.

Q. Was there anything -- well, let me just generally ask. Were the conclusions that you reached in terms of your numerical calculations consistent with what you reviewed as part of the history of boating on that portion of the Gila River? Were those two things consistent?

A. I thought so.

Q. All right.

MR. MURPHY: I think that's all the questions I have.

CHAIRMAN NOBLE: Good. Let's go home. How about tomorrow at 8:30 a.m.? Do you want to vote on it or let the Chairman make the decision?

MR. KATZ: The only thing I would be concerned

about is making sure we're not violating the Open Meeting rule.

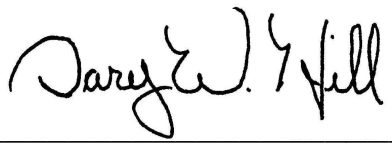
CHAIRMAN NOBLE: Okay. We'll start at 9:00.

(The proceeding recessed at 4:30 p.m.)

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, GARY W. HILL, Certified Reporter No. 50812 for the State of Arizona, do hereby certify that the foregoing printed pages constitute a full, true and accurate transcript of the proceedings had in the foregoing matter, all done to the best of my skill and ability.

WITNESS my hand this 3rd day of July, 2014.



GARY W. HILL, RMR, CRR
Certified Reporter
Certificate No. 50812