Documentation Related to a 1991 Observation of Sturgeon in the Rio Grande – Río Bravo, USA (Texas) and Mexico (Coahuila)

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Executive Summary

This digital archive provides a compilation of previously unpublished information regarding a 1991 observation of a live sturgeon (Family Acipenseridae) in the Rio Grande-Río Bravo of the USA and Mexico. Though a few specimens collected in the 19th century support occurrence of sturgeon in this river basin, lack of credible, recent records has often led to this species not being recognized as part of the basin's native fish fauna, and certainly not part of its modern fish community.

The second and third authors of this document manage the Fishes of Texas Project (Hendrickson, Dean A., & Cohen, Adam E. (2015). Fishes of Texas Project Database (version 2.0). Texas Advanced Computing Center, University of Texas at Austin. http://doi.org/10.17603/C3WC70) and knew of the unpublished 1991 observation of sturgeon reported here. They requested the content provided here from first author (Platania) who provided what follows below (verbatim as received in April 2018) and permission to archive it for public access.

Documentation related to 1991 visual observation of sturgeon

1. An updated perspective ("Supplemental Sturgeon Notes") of the visual observation written by Platania in April 2018, just prior to publication of this archive.
2. Correspondence sent by Platania in 2003 to the American Fisheries Society's Common Names of Fishes Committee about the 1991 visual observation and inclusion of the taxon in products of that committee
3. The verbatim original manuscript reporting the 1991 Texas visual observation that was prepared by Platania and co-authors present when the specimen was seen. Though submitted for publication, it was never published.

1. Supplemental Sturgeon Notes (written by Platania April 2018)

It would be nice if it were as simple as publishing the 1991 manuscript. But it has gotten complicated since then (and in many ways, I was relieved the manuscript was never published).

I am not sure how to proceed as there is some "new" information that could/should be added as an addendum to the manuscript:

1) In 1995, I visited the U.S. Fish and Wildlife Service's Gavin Point National Fish Hatchery in Yankton, South Dakota where I observed (and briefly handled) large brood stock Pallid Sturgeon *Scaphirhynchus albus.* That experience modified my opinion on the species of sturgeon that we saw in the Rio Grande in 1991. Prior to the 1995 Yankton trip, I was convinced that the Rio Grande sturgeon could **ONLY** be, based on ventral head morphology (and size) *Acipenser.* Another factor that influenced my identification of the Rio Grande sturgeon was **my mistaken perception** that all species of *Scaphirhynchus* were superficially similar to *Scaphirhynchus platorynchus* (i.e., head morphology and small size). My introduction to Pallid Sturgeon at Gavin Point blew me away. It also showed me that my assumption of morphological similarity between all *Scaphirhynchus* was **completely wrong**. As such, my hypothesis for the manuscript (that it was an *Acipenser*) is invalid.

2) In the 2004 AFS Names checklist (Nelson et al. 2004) - page 193 (in reference to *Acipenser oxyrinchus* on page 58) stated " Occurrence in Mexico based on a 1991 sight record , thought to be of this species, from Big Bend area of Rio Grande/Rio Bravo, Texas/Coahuila (S. P. Platania personal communication January 1993, and a 1991 manuscript report by S. P. Platania, D. A. Young, and B. M. Burr),

I had presented the results of our sampling efforts at the national meeting of the American Society of Ichthyologists and Herpetologists (including the sturgeon) and had given a copy of the manuscript (in 1992) to Carter Gilbert, Curator of Fishes, Florida State Museum of Natural History, University of Florida. In 2003, I was contacted by Carter Gilbert, in his position as a member of the Committee on Names of Fishes, in reference to the 1991 sturgeon sighting and its inclusion in the upcoming (2004) Common and Scientific Names of Fishes from the United States, Canada, and Mexico. I do not have a copy of Carter's original email to me but I did retained a copy of my response to his inquiry (attached). I do not recall any additional correspondence with the Committee on Names of Fishes.

Another, albeit minor, change is that occurred in 2004 was the spelling of the specific epithet of Atlantic Sturgeon changed with Nelson et al. 2004 from *oxyrhynchus* to *oxyrinchus.*

Finally, there are two other clarifications I would like to make in reference to this sighting and manuscript. Doug Young and I were on the electrofishing raft that shocked the sturgeon. Doug was netting and I was rowing/operating the electrofisher. Brooks Burr and our hired raft guide (Jim Green) had proceeded further downstream (seining) and were waiting for us at upstream end of Panther Rapids. Doug Young and I were the only individuals to see the fish and both of us clearly saw a very large sturgeon. Brooks Burr and Jim Green did not see the fish as they were too far away. Brooks did tell us they knew we found something interesting because they heard us yelling and saw us jumping around on the raft.

The second item I want to add is the precise location of the sighting. In addition to river guides to the lower canyons, we were carrying a complete set of 7.5 minute USGS quadrangles of the study area. Panther Rapids (located on the "Panther Gulch East, Tex-Coah" quadrangle) is a well-defined location making it very easy locate the site that the sturgeon was detected. Using google maps and original 1991 notes transcribed on the USGS quadrangles, I have calculated the approximate site of occurrence as UTM 754813E, 33033432N, 13R.

2. Correspondence with American Fisheries Society Fish Common Names Committee

14 January 2003

Dear Carter et al.,

Sorry for the delay in getting back in contact with you regarding listing *Scaphirhynchus platorhynchus* from Mexico in the upcoming AFS-ASIH checklist.

First I'll provide the background information regarding "our" sturgeon sighting in an attempt to clarify confusion regarding that undocumented record.

Call me Ishmael. In April and May 1991 I organized a crew to sample the Rio Grande from near Terilunga (TX), through Big Bend, downstream to Dryden (TX). Sampling was accomplished in rafts with one raft equipped with mounted electrofishing gear and the other carrying field personal and supplies. The sampling party consisted of Gerald Burton (FWS), Brooks Burr (SIU), Doug Young (USBR), one hired oarsman (= river runner) and myself . On 2 May 1991, Doug Young and I crewed the electrofishing raft (Doug netting and me rowing and operating the electrofisher). We were drifting about 2-3 m from the bank when (at 1600 h) a large galvanonarcosed fish appeared about 2 m in front of the raft (ventral side up and snout pointed directly at the raft) and swam/drifted into the dip-net (head first). The problem was that the fish was estimated to be 2 m long, the head 2 ft long, but the net was only 1-1.5 ft deep (big enough to catch large buffalo, gar, flathead catfish, etc. but not this fish).

Facts: we saw the ventral surface of the fish for at least 10 seconds, we saw the sharply pointed snout, we saw the protruding mouth, we saw the barbels, we saw the clear, smooth belly, we saw the scutes on the edges of the lateral surfaces, we saw a fish that weighed at least 20 kg, we saw a sturgeon.

Speculation: Which Species ?: It was way, way, way, to big to be a *Scaphirhynchus platorhynchus* (which I have sampled in the past). Also the head shape was completely wrong for that taxon. I gave no thought to the possibility of this fish being *Scaphirhynchus albus* because the head shape of the fish we observed dismissed all possibility of it being a member of the genus

Scaphirhynchus in addition to the zoogeographic unreality (I assumed *S. albus* was just a large version of *S. platorhynchus*).

The first paper I looked at upon return to Albuquerque 6 May 1991 was that of Vladykov and Greeley (1963) because I remembered that it contained nice illustrations of the ventral surfaces of the heads of sturgeon. Both Doug (Young) and I picked Figure A (pg 34) as what we observed (*Acipenser oxyrhynchus*). Given this new information, I prepared a note for publication regarding the sighting. The note "**Observation of the Atlantic sturgeon in the Rio Grande, Texas and Mexico, with comments of Rio Grande records of *Scaphirhynchus platorhynchus***" was submitted to two journals but rejected (rightfully so) because of the lack of a specimen -i.e., it was simply a "sight record."

The story continues.... In 1995, I was in Yankton, South Dakota doing some work with FWS and had the opportunity to visit Gavins Point National Fish Hatchery (in Yankton, SD) which specializes in the rearing of *Scaphirhynchus albus*. They had several (10-20) very large breed-stock *S. albus* at the facility that I was quite interested in seeing. As I walked up to the several thousand gallon tank containing breed-stock *S. albus*, I was dumbfounded. They looked nothing like what I expected - in fact they looked more like *Acipenser* than *Scaphirhynchus* (at least ventrally in the head region).

The FUNCTIONAL (REAL) RESULT: This was a sight record and deserves no mention in the literature and, in my opinion, does not factor in one bit to your decision making process regarding *S. platorhynchus* or *Acipenser oxyrhynchus* in the Rio Grande, Mexico. In the intervening years, I have come to the conclusion that the observation was not worthy of publication - regardless of any potential ambiguity regarding whether it was an *Acipenser* sp. versus a large *Scaphirhynchus albus*. (I am still sure it was a sturgeon and have an opinion as to which one of the two it was but the truth is it really doesn't matter).

Caution: I would strongly suggest that you reconsider including Mexico in the distribution of *Acipenser oxyrhynchus* based solely on our sight-record as it imparts a validity to the record that is not warranted.

Direct response to question posed in the e-mail - Hector is mistaken and confusing the sturgeon we observed as a *S. platorhynchus* (and I have not told most people about my revelation after seeing *Scaphirhynchus albus* - wanted to let sleeping dogs and ghosts lie).

A copy of the rejected manuscript is attached for your files and edification (not meant as supportive material). Please note the reference to Toomey 1991 and the formerly misidentified Holocene deposits of *S. platorhynchus* from the Rio Grande Valley (Texas). I did not see this referenced in any of the correspondence. It adds credibility to the Rio Grande occurrence of *S. platorhynchus* and the two records reported in Cope and Yarrow 1875.

Thank you for the opportunity to have input in this discussion. I am available if you have any other questions or need additional clarification.

Steven

and the Rio Grande rolled "on as it rolled five thousand years ago." (apologies to Melville)

3. Original 1991 Manuscript as Submitted to Peer Reviewed Journals

Observation of the Atlantic sturgeon, *Acipenser oxyrhynchus*, in the Rio Grande, Texas and Mexico, with comments on Rio Grande records of *Scaphirhynchus platorynchus*

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The first scientific collection of fish from the Rio Grande drainage was made in 1851 by John H. Clark, a naturalist assigned to the United States and Mexican Boundary Commission (Evermann and Kendall 1894). Since then there have been numerous published reports on selected Rio Grande fish taxa or the ichthyofauna of discrete reaches of the Rio Grande. Despite its size and length, there have been no efforts to survey the large-river fishes of this, the fifth longest river in North America. We felt that, due to this bias in collecting efforts and techniques, previous reports on the Rio Grande ichthyofaunal assemblages and abundance might not reflect actual occurrences.

From 13 April until 3 May 1991, we conducted the first extensive survey of fishes in the Rio Grande, Texas and Mexico, between Presidio and Dryden. Fishes were sampled using raft-mounted electrofishing gear, 1, 3, and 5 m seines, 30 m trammel nets, and 10 m baited trot-lines. A total of 145 collections was made in 420 km of the mainstem Rio Grande of which 80% (336 km) was under the jurisdiction of Big Bend National Park, U.S. National Park Service. Herein we recount the discovery of a previously unreported large-river fish from the Rio Grande.

On 2 May 1991 at approximately 1600 h, a large sturgeon believed to be *Acipenser oxyrhynchus* was observed at River Mile 716.4, approximately 0.5 km upstream of Panther Rapids, Brewster Co., Texas (River Miles designated by International Boundary and Water Commission with River Mile 0 denoting the mouth of the Rio Grande). The electrofishing raft was sampling the south shoreline, 2–3 m

from the bank, in water 1.5 m deep when the fish was observed. The galvanonarcosed sturgeon appeared approximately 2 m in front of the raft, appeared to swim out from the bank, and was oriented directly towards the anode located 1 m off the raft's bow with its ventral surface up. An attempt was made to net the fish but only the anterior-most portion of its head fit into the 41 cm x 41 cm x 36 cm deep dip-net and therefore it slipped out of the net. The fish remained on its back in a galvanonarcotic state for about 10 seconds and then sank out of sight.

The clearest and most sustained view of the sturgeon occurred during the few seconds that its long snout was in the dip-net. We were within 1 m of this fish and observed its large, protrudable, inferior mouth, sharp V-shaped or pointed snout, opercular openings, pectoral fins, and creamy white ventral surface. The only portion of the head which could fit into the 36 cm-deep net was the snout; the mouth was still outside of the net frame. We estimate that its head width, just anterior to the mouth, was 25–30 cm.

The limited water clarity (<0.25 m) and angle at which the sturgeon approached the raft allowed us a view of only the fish's ventral region from its snout to what we believed was mid-point of its abdomen. We estimated the length of this segment to be 1 m and total length of the fish as 1.5–2.0 m. Lateral and dorsal views of the sturgeon were not possible.

After the sturgeon disappeared from view, we held the raft in position for several minutes hoping the fish would re-surface and allow us another opportunity to capture it. We discontinued shocking immediately after the fish disappeared due to concern of causing injury. Approximately five minutes after the initial sighting, we interrupted our search and rowed 0.5 km downstream to Panther Rapids. The Rio Grande, at Panther Rapids, is 25 m wide and relatively shallow (<1 m). We stationed people at the upper end of the rapids and on a 15 m high rock ledge overlooking the rapids where they waited for almost 1 hour to see if the stunned fish floated downstream. The sturgeon was not seen during the remainder of the survey.

Trip participants who saw the fish stated that its large size (based on only a portion of its head filling the net and what little was seen of the body), pointed snout, and large and inferior mouth were its most prominent characters. Approximately one week after the sighting we were shown Figure 7

(without the accompanying caption) from Vladykov and Greeley (1963) and each independently selected *A. oxyrhynchus* as the fish observed on 2 May 1991. The aforementioned figure provided ventral illustrations of the heads of *A. oxyrhynchus*, Lake sturgeon (*A. fulvescens*), and shortnose sturgeon (*A. brevirostris*).

In North America, the family Acipenseridae (sturgeons) is represented by seven species in two genera. One of the more widely distributed North American members of this family is the Atlantic sturgeon (*Acipenser oxyrhynchus*) which ranges from Hamilton Inlet, Labrador, to the mouth of the Mississippi River, Louisiana (Vladykov and Greeley 1963, Gruchy and Parker 1980). Disjunct records of this species were reported from Bermuda in 1876 and 1887 (Beebe and Tee-Van 1933) and French Guiana (Dumeril 1867 [=*Acipenser cayennensis*], Vladykov and Greeley 1963). Vladykov (1955), noting differences in bony shield shape and morphology, recognized Atlantic Coast (*A. o. oxyrhynchus*) and Gulf of Mexico (*A. oxyrhynchus desotoi*) forms of this taxon. This is the only species of *Acipenser* known from the Gulf of Mexico.

There are at least seven man-made barriers on the Rio Grande between RM 716.4 and the Gulf of Mexico which could prevent upstream movement of fish. The oldest impoundment, Falcon Dam, is located at RM 150 and was completed in 1954. Anzalduas and Retamal dams, irrigation diversions located between Falcon Reservoir and the mouth of the Rio Grande, were finished in 1960 and 1975, respectively. Amistad Dam began impounding the waters of the Rio Grande and Pecos and Devils rivers in 1968. Each of the three remaining smaller diversions located between Amistad and Falcon reservoirs were built after 1970.

The anadromous nature of *A. oxyrhynchus*, rate of growth while in marine environments, and the large size (ca. 1.5–2.0 m) of the observed specimen suggest that this individual was a mature fish when it became isolated in the Rio Grande. To accommodate this scenario the fish must have been present above Falcon Dam prior to its construction in the early 1950s and upstream of Amistad Dam before its construction began around 1964. Assuming that the fish was at least 9 years old, the minimum age reported for spawning *A. o. desotoi* (Huff 1975), when it moved upstream of Falcon

Reservoir, it would have been at least Age 50 when discovered and spent 40± years isolated in the Rio Grande.

None of these assumptions is contradictory to published studies on *A. o. desotoi*. Huff (1975) conducted one of the few life-history studies on the Gulf Coast subspecies of Atlantic sturgeon and reported maximum known age for a specimen from the Suwannee River as 42 years. Vladykov and Greeley (1963) reported that *A. oxyrhynchus* may remain in the fresh and brackish water environments of the St. Lawrence River throughout its life. Both subspecies are anadromous and achieve most of their growth in the ocean (Vladykov and Greeley 1963). In addition, the Bermuda and French Guiana records of *A. oxyrhynchus* suggest a wider distribution than indicated by specimen records.

The Gulf Coastal distributions of *A. oxyrhynchus* and shovelnose sturgeon (*Scaphirhynchus platorynchus*) are similar in that numerous records exist for both species around the mouth of the Mississippi River (Bailey and Cross 1954, Lee 1980, Gruchy and Parker 1980) but the only extant sturgeon records from any of the major western Gulf Slope drainages is of *S. platorynchus* in the Rio Grande. The lone non-archeological Rio Grande report of shovelnose sturgeon, which is substantiated by two voucher specimens, is from Albuquerque, New Mexico (Cope and Yarrow 1875; USNM 15994). Bailey and Cross (1954) reviewed the history of *Scaphirhynchus mexicanus* which was described by Giltay (1929) and based on a single mounted specimen from Mexico or Texas captured prior to 1859. They concluded that until the type specimen could be examined, *S. mexicanus* should be considered a synonym of *S. platorynchus* (Bailey and Cross 1954).

Additional hearsay accounts of fish resembling shovelnose sturgeon were reported from Santa Elena Canyon in Big Bend prior to the 1940s (Clark Hubbs pers. comm.), near Dryden Crossing, and also from Mexican tributaries in Coahuila (Hubbs et al. 1977). Miller (pers. comm.) relayed second-hand accounts of putative shovelnose sturgeon being occasionally caught in the Rio Grande at Piedras Negras, Mexico, until 1950. Smith and Miller (1986) considered *S. platorynchus* extirpated from the Rio Grande basin. Toomey (1991) provided information on the apparent historic abundance of shovelnose sturgeon in the Rio Grande based on his discovery of their remains, which had previously been incorrectly identified as gar (*Lepisosteus* sp.), at six Holocene archaeological sites in Amistad Reservoir region of Val

Verde Co., Texas. If the Cope and Yarrow (1875) specimens did not exist and Toomey (1991) had not re-examined Amistad Reservoir region archaeological remains, there would still be considerable question about the occurrence of this species in the Rio Grande as it too would represent a disjunct population and range extension of over 2,500 km.

Preliminary results of our 1991 survey indicate that the mainstem Rio Grande between Presidio and Dryden may be refugia for several riverine fishes. Blue sucker (*Cycleptus elongatus*), smallmouth buffalo (*Ictiobus bubalus*), and west Mexican redhorse (*Moxostoma austrinum*) were absent from our recent Rio Grande ichthyofaunal surveys above Presidio (1988) and downstream of Amistad Reservoir (1990) but present in our 1991 study area. Up-and-downstream reaches have been significantly altered by changes in river management practices. The Rio Grande maintains perennial water, due to the contribution from the Conchos River, from Presidio downstream to Amistad Reservoir. It is in this reach that riverine fish would be expected to best endure prolonged periods of drought.

While skeptics of this putative *A. oxyrhynchus* record will doubtless cite the lack of a voucher specimen as the primary reason for their concern, the size of the observed specimen eliminates the probability that the fish was a *Scaphirhynchus*. The excellent view we had of the ventral portion of the head which correspond to the unique characteristics of *Acipenser oxyrhynchus* also add considerable credence to the specific identification of the observation. One of the purposes of this report is to alert archaeologists and future investigators to the occurrence of *Acipenser* in the Rio Grande in hopes that additional corroborative material may be obtained. We would be remiss if we did not consider, however remote, the possibility that the sturgeon we observed was a transplanted specimen. We doubt that conclusive evidence of the sturgeon's origin will ever be acquired.

We thank additional trip participants G. L. Burton, U.S. Fish and Wildlife Service (FWS), and J. R. Green for their help in the field. The 1988-1991 Texas Rio Grande ichthyofaunal surveys would not have been possible without the support of J. Fowler-Propst, Albuquerque Office of Ecological Service (FWS), J. Johnson, Endangered Species Program, Albuquerque, (FWS), and J. E. Brooks, Dexter Fisheries Assistance Office (FWS). Drs. R. R. Miller and Clark Hubbs provided informal information, based on

discussions with Big Bend area residents, of the former occurrence of shovelnose sturgeon while R. S. Toomey, III freely discussed his recent discovery of Holocene sturgeon prior to publication. We also thank G. P. Garrett, Texas Parks and Wildlife, for his support and assistance in securing necessary collecting permits. Finally, M. Flemming's (Big Bend National Park) unwavering support and extraordinary personal and logistical contributions allowed us the opportunity to conduct this unfunded and intensive fish survey of the Big Bend region of the Rio Grande.

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