

# Public Service Company of New Mexico (PNM) Fish Passage Facility

\*2020\*

## Annual Report



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To:  
The San Juan River Basin Recovery Implementation Program

## Executive summary

- PNM fish passage was operated for 147-days between June 9 – Nov 2, 2020
- There was a period of time from June 2<sup>nd</sup> to the 9<sup>th</sup> where basic maintenance and general channel cleanup was conducted before the electrical and rotating brush/cleaner bolts were to be connected. Also the removal of fine sediment, small and large woody debris at the front of the intake caused a 2-day weekend flush routine and continuous water flow thru to flush the accumulated debris down through the channel and into the passage.
- 4,306 total fishes were captured in the fish passage. Of that 3,861 were native fish, 288 endangered, and 157 were nonnative fishes, all being captured, enumerated, and released upstream of the weir. The nonnative fish, of course, permanently removed from the system.
  - 272 Colorado Pikeminnow
  - 15 Razorback Suckers
  - 1 Roundtail chub

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## ***I. Introduction***

The federally endangered Razorback Sucker (*Xyrauchen texanus*) and Colorado Pikeminnow (*Ptychocheilus lucius*) are the focus of recovery efforts within the San Juan River Basin Recovery Implementation Program (SJRRIP). The decline in abundance of endangered fishes in the San Juan River is thought to be a function of altered flow regime, loss of physical habitat through water development, and negative interspecific interactions from introduced, non- native species (SJRRIP 2010, Brooks et al. 2000). For over a decade, management efforts aiming to recover the two endangered species have included large scale non-native fish removals, operation of Navajo Dam to mimic a natural hydrograph, range expansion resulting from fish passage structures, and large scale endangered fish augmentation. These efforts have primarily been focused between river mile (RM) 180 (the confluence with the Animas River, New Mexico) downstream to RM 0 (Near Piute Farms, Utah). At river mile 0, a large waterfall created an upstream barrier separating the San Juan arm of Lake Powell from the San Juan River and at RM 166.6 a river-wide weir obstructs movement upstream except during high flow events and when the Public Service Company of New Mexico (PNM) fish passage is in operation.

This river-wide obstruction at RM 166.6, a 3.25' diversion dam (weir) constructed in 1971, transects the entire width of the San Juan River, near Fruitland, NM. This weir includes a concrete barrier, a series of screened intake structures, an intake channel, a settling channel, and a pump house, which impedes the ability of native and endangered fishes to move upstream (BOR 2001). Studies have shown that some upstream movement could likely occur when flows reach 7,000 cfs or greater; however, flows of this magnitude are relatively rare (BOR 2001). The weir diverts water to be used at the nearby San Juan Generating Station, and fish passage is needed to allow native fish access to habitats above this diversion during critical periods (i.e.,

reproductive periods) and for refugia and foraging habitat. Adult monitoring upstream of the weir has continued to show use by endangered and other native fishes. Non-native species, particularly Channel Catfish, have lower densities in this reach than other reaches (Ryden 2009). For these reasons, selective passage at the PNM weir is important for the overall recovery of the San Juan River endangered fishes.

## ***II. Methods***

The Navajo Nation Department of Fish & Wildlife is responsible for the operation and basic maintenance of the PNM fish passage under the guidance & direction of the SJRRIP. Since 2016, the facility was operated as early as February/March to October, early depending on sediment build-up and debris needed to be removed from the front or riverside intake grate. This being solely dependent on river flow and volume of accumulated debris. Clearing this portion of the intake is typically done manually by cutting a channel through the sediment to help aid the breakdown of sediment with river water and to allow for faster flowing water to flow, opening the intake eventually. 2020 the opening of the season saw two new water cannons positioned just above, overlooking the riverside intake. Both can be adjusted and aimed at the incoming eddy and as well as the down-river wall side of the continued intake. Connected pumps having enough pressure to flush through the sediment and clearing out a channel in a matter of hours, where before 2020, it would have taken days to clean out.

Since 2018, the PNM fish passage has been operating as an Efficiency Study (flow-through study) from March 1 to June 1. This flow-through study, in collaboration with the Program Office, will determine an efficiency usage by the fish community. This study will continue in the future by both agencies or until both agree to conclude the study.

This flow-through study is the complete opening of the south river gate, allowing water to flow through the channel, through the basin, eventually returning back into the river below the weir. At this time no fish is hand-processed by the NNDFW or anybody else. This is strictly water flowing through the passage, determining the passage use by fish being present within the ladder system. The north-channel gate will remain closed during this time period and will not be utilized until the study period has concluded. However, depending on sediment being deposited at the riverside intake, NNDFW will occasionally flush both channels until sediment is cleaned out and the conditions for the flow-through study are returned to original study settings. The study will run unimpeded seven days a week, 24 hours a day from March 1 to June 1, weather and water flow permitting. Throughout this time, the NNDFW staff has maintained flow and the general maintenance of the facility from flow changes and vandalism.

After the conclusion of the flow-through period ending in March 1, the general passage operation will resume and will begin processing fish at about 10:00 am each day, weather permitting. Regardless, the passage is designed to self-capture fish over a 24-hour period, so long as the channel gates are put in place, at the bottom of the capture basin, and until staff is able to hand process the fish.

Water intake is controlled by two mechanical gates (river doors) on the upstream end of the capture basins. The river doors are opened as high as needed to allow the maximum amount of water through the facility that the river is able to provide at any given time. NNDFW staff try to maintain flow through the passage that consistently supplies enough volume to provide an adequate “cue” for fishes to find the passage entry from the river. Once fishes move up the 400 foot artificial passage, they enter an upstream angled grate, with an opening of approximately 5 inches. Once they have passed through this grate, fish are trapped in a concrete basin between a ¾” grate at the upstream end and the angled grate at the downstream end, which is designed in a

manner so fish cannot easily find the opening while having to swim in an upstream direction against the current.

The river doors are closed prior to netting the captured fishes. However, enough water is allowed thru so that capture fish are able to swim about without being stressed, but less that a strong current within the basin for ease of capture and safety of personnel. A large crane-mounted net is lowered into the capture basin while fish are dip-netted and placed into the large crane net. Once all fishes have been collected from the basin, they are hoisted and releases on to a holding table with water flowing in and held at about 8" of water for processing. The passage and all doors, grates, gates, and capture basins are then cleared of any debris.

All fishes captured are identified to species and enumerated. Endangered fishes (Colorado pikeminnow - CPM, Razorback sucker - RBS, Roundtail chub - RTC, Bonytail chub - BTC) are measured for total length (TL - mm), standard length (SL - mm), and weight (WT - grams). They are scanned for a PIT tag and if a tag id number is not found, a 134.2 kHz Passive Integrated Transponder (PIT) tag is implanted. All other native and non-native fishes are enumerated and recorded. When all native fishes have been processed they are released from the 200 gallon holding tank just below the processing table, they are flushed through an eight inch PVC pipe that directs them upstream of the PNM weir. When all fishes have been processed, a wait minimum wait time of 30 - 45 minutes is generally implemented before opening the river gates. This helps to minimize an increased stress or possibly killing of released fish, by potentially being swept back into the upstream end of the passage intake grate by the current.

Non-native fishes are also counted and TL -mm is recorded and they are permanently removed from the river. If large numbers of catfish are captured, NNDFW staff are able to stock them into one of the Navajo Nation recreational fishing lakes or donated to local people for food.

### ***A. PIT tag antenna***

A permanent stationary PIT Tag antenna was installed in the passage canal just upstream of the canal outlet, downstream of the PNM Weir. The antenna began operation on March 21, 2014 and operated continuously throughout the season. The antenna covered the entire passage channel and allowed for detections of fish that entered the canal beginning the fish ladder entrance. The objective of placing this antenna in the canal was to determine the number of fish that entered the entire fish ladder compared to the number of fish that were successfully passed through the facility. This information is useful in making management decisions that can improve the ability of the facility to successfully pass native fish. Additionally, detections of fish on the passage antenna are useful information for seasonal movement, seasonal location and local abundance, and survival of tagged fishes.

An additional antenna was install by the BOR/Biomark in March of 2021. This antenna aids in the detection of tagged fish utilizing the passage as well as entering into the capture basin, where NNDFW staff will hand process all fish. Currently there are two river antennas, sitting just on the weir. Originally there were four, but in the last three years, several rain events caused one of the antenna to be flushed down below the weir. Again happening within two years of the first event, the second antenna was flushed down river. Within the fish ladder itself, there are a total of four rectangular black pvc encased antenna rings that sit the width of the channel. Thus fishes with PIT tags detected show movement, either downstream or upstream, or even through the facility, or just resting within the ladder.

### ***III. Results***

During operation of the fish passage in 2020, actual fish processing started June 9. A total of 4,306 fishes were captured (Table 1). Of these, the majority were native fishes (4,149; 96%)



and very few were non-native (157; 3%). Five species of native fishes were captured along with ten non-native species. Bluehead suckers - BHS (2093) 48% were the most abundant native species captured, followed by Flannelmouth suckers - FMS (1768) 41%, followed then by the Colorado pikeminnow - CPM (272) 6%, Channel catfish - CCF (70) 1.6%, Common carp - CCP (23) 0.5%, Brown trout - BRT (20) 0.4%, Razorback sucker -RBS (15) 0.3% and Black bullhead – BBH (15) 0.3%. These listed here being the most abundant in the season. The table (and tables in the appendix) below shows the total species processed by NNDFW staff.

Also uniquely captured during July was a PIT tagged Flannelmouth sucker in July and in October a Bluehead sucker. Both implanted with a PIT tag from a spring tagging trip by Keith Guido and Matt Bogaard near the Paiute Falls area in the early March 8 -13. Both fish were not tuberculated, nor releasing gametes, or tuberculated, but were released alive from the facility. Having been through the facility, their measurements and weight were both recorded and uploaded in to the Streams data system.

Table 1. Native and non-native species captured at the PNM fish passage by number of individuals in 2020.

|            | JUN       | JUL       | AUG        | SEP      | OCT      | NOV          | TOTAL        |
|------------|-----------|-----------|------------|----------|----------|--------------|--------------|
| BHS        | 331       | 886       | 350        | 382      | 133      | 11           | 2093         |
| FMS        | 331       | 612       | 369        | 373      | 78       | 5            | 1768         |
| <b>CPM</b> | <b>64</b> | <b>74</b> | <b>134</b> | <b>0</b> | <b>0</b> | <b>0</b>     | <b>272</b>   |
| CCF        | 17        | 17        | 36         | 0        | 0        | 0            | 70           |
| CCP        | 4         | 1         | 7          | 10       | 1        | 0            | 23           |
| BRT        | 2         | 18        | 0          | 0        | 0        | 0            | 20           |
| <b>RZB</b> | <b>0</b>  | <b>3</b>  | <b>2</b>   | <b>2</b> | <b>8</b> | <b>0</b>     | <b>15</b>    |
| BBH        | 7         | 0         | 7          | 1        | 0        | 0            | 15           |
| WS         | 3         | 3         | 2          | 3        | 0        | 0            | 11           |
| SMB        | 1         | 1         | 2          | 5        | 2        | 0            | 11           |
| GRS        | 0         | 3         | 0          | 0        | 0        | 0            | 3            |
| RBT        | 1         | 0         | 1          | 0        | 0        | 0            | 2            |
| <b>RTC</b> | <b>0</b>  | <b>1</b>  | <b>0</b>   | <b>0</b> | <b>0</b> | <b>0</b>     | <b>1</b>     |
| LMB        | 0         | 1         | 0          | 0        | 0        | 0            | 1            |
| FHM        | 1         | 0         | 0          | 0        | 0        | 0            | 1            |
| BLG        | 0         | 0         | 0          | 0        | 0        | 0            | 0            |
|            |           |           |            |          |          | <b>TOTAL</b> | <b>4,306</b> |

Total fishes caught in 2020

Native – FMS and BHS: 3861

Endangered – CPM, RZB, RTC: 288

Nonnatives – 157

**Total: 4,306**

#### ***A. Razorback suckers***

For the Razorback sucker, the previous year's RBS processing are as follows, 2017 (n=330), 2018 (n=87), 2019 (n=84), and 2020 (n=15). There were 15 total Razorback suckers captured in 2020. This is a drop from our prior Razorback sucker numbers observed since 2017. However, we have been recapturing more adults than new unique individuals, also in this season, we saw the highest number of 15 RBS come thru on the month of October. Which a little more than half the seasons RBS processed by hand, given only a few total RBS we seen this season. Which is not what we typically see in previous years of July-August. Also since 2018, RBS processing has decrease at the PNM facility.

There are some adults exhibiting spawning conditions that were observed in 2017, 2018, 2019, and 2020.

### ***B. Colorado pikeminnows***

The number of Colorado pikeminnow captured in 2020 (n=272) was about the range we have been seeing them since 2017. The previous years have seen 2017 (n= 206), 2018 (n=183), 2019 (n=122). Having processing them in higher number through July and August, typically the higher flows. However, in 2020, we did see a 1 day surge in CPM appearance. Then eventual tapering out as the days and weeks continued.

Aug. 4, 2020 NNDFW processed a total of 58 CPM. Implementing new tags into 52 individuals, having recaptured 6 individual CPM that day. The largest of the CPM measured at 545mm TL, 365 SL, and 1200 g. The smallest being measured at 345 mm TL, 317 mm SL, and weighing 620 g. The average size of that specific haul having a TL being 414 mm TL, 344 SL, and Wt. 552 g. This was the largest surge in a small time frame with CPM within this season. No other large one day surge or any other increased number of RBS occurred in this season. The majority of Colorado Pikeminnow captures occurred in July & August. This remained consistent with previous years.

### ***C. Fish Passage PIT Antennae***

This past season, 2020, we did a lack of antenna detections due to electrical connections shortages as well as vandalism plaguing exposed lines and cable connections. Once identified and corrected, these issues were resolved and detections were ongoing. Most problems or issues are noted and repaired in coordination with the people at BioMark, P.O, and others using the PIT system detections.

#### *IV. Discussion*

Complete use of the fish passage during the March-June 2020 season was successful in allowing upstream movement of native fishes. Since the installation of the automatic screen cleaners in 2015 to the addition of the stationary water canon in early 2020, the passage facility has also greatly decreased the sediment build-up to almost a minimum. The maintained and consistent water flowing, as well as lack of sediment deposition, allows for any number of fish successfully passing through the facility during the open season.

With some minor mechanical or equipment setbacks and repairs every season, and throughout the season, and as weather related issues like a rain events with heavy debris, the overall season of 2020 showed promising signs for Colorado pikeminnows. However the decreased numbers of Razorback suckers in the smaller size class seem less abundant than that compared to the Colorado pikeminnows. However, we do tend to see adult RBS coming through the facility, we are also seeing more CPM being newly tagged come through as well.

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# Appendix

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DATA TABLES SHOWING MONTHLY FISH PROCESSED AT PNM FISH  
PASSAGE BY NNDWF STAFF 2017 – 2020

YELLOW INDICATES HIGHEST CATCH VOLUME OF LABELED SPECIES  
WITHIN THE LABELED SEASON

ORANGE INDICATES TOTAL HAND PROCESSED FOR THE SEASON

3 CATEGORIES OF FISHES ARE AS FOLLOWS: THREATENED/ENDANGERED  
(T/E), NATIVE (NTV), AND NONNATIVE (NNTV)

# Appendix A

## A1. 2017 DATA PNM Weir fish Passage

Table 1. Includes 2017 fish total caught and processed

Opened March 31 – October 5, 2017 \*closed early due to trash rack motor burning out

|              | NTV         |             | T/E        |            |          | NNTV      |            |          |          |           |           |          |          |          |           |              |
|--------------|-------------|-------------|------------|------------|----------|-----------|------------|----------|----------|-----------|-----------|----------|----------|----------|-----------|--------------|
|              | FMS         | BHS         | CPM        | RBS        | RTC      | BBH       | CCF        | BRT      | RBT      | CCP       | WHS       | GRS      | SMB      | BLG      | Other     |              |
| Feb          | 0           | 0           | 0          | 0          | 0        | 0         | 0          | 0        | 0        | 0         | 0         | 0        | 0        | 0        | 0         | 0            |
| Mar          | 0           | 0           | 0          | 0          | 0        | 0         | 0          | 0        | 0        | 0         | 0         | 0        | 0        | 0        | 0         | 0            |
| Apr          | 2627        | 986         | 1          | 38         | 0        | 1         | 1          | 3        | 1        | 3         | 24        | 0        | 0        | 0        | 1         | 3686         |
| May          | 2487        | 1093        | 2          | 39         | 0        | 0         | 0          | 0        | 0        | 0         | 15        | 0        | 0        | 0        | 2         | 3638         |
| Jun          | 652         | 371         | 0          | 30         | 1        | 0         | 0          | 0        | 0        | 0         | 9         | 0        | 0        | 0        | 3         | 1066         |
| Jul          | 2770        | 1970        | 68         | 114        | 2        | 19        | 150        | 3        | 1        | 7         | 27        | 0        | 4        | 5        | 17        | 5157         |
| Aug          | 1375        | 301         | 134        | 100        | 0        | 11        | 155        | 0        | 3        | 1         | 5         | 0        | 0        | 0        | 2         | 2087         |
| Sept         | 51          | 13          | 1          | 9          | 0        | 6         | 6          | 0        | 0        | 4         | 1         | 0        | 3        | 0        | 2         | 96           |
| Oct          | 12          | 2           | 0          | 0          | 0        | 0         | 0          | 0        | 0        | 0         | 0         | 0        | 0        | 0        | 0         | 14           |
| <b>TOTAL</b> | <b>9974</b> | <b>4736</b> | <b>206</b> | <b>330</b> | <b>3</b> | <b>37</b> | <b>312</b> | <b>6</b> | <b>5</b> | <b>15</b> | <b>81</b> | <b>0</b> | <b>7</b> | <b>5</b> | <b>27</b> | <b>15744</b> |

  

|              | T/E FISH   |            |          |            | NTV          | NNTV       | T/E | NTV   | NNTV | TTL   |
|--------------|------------|------------|----------|------------|--------------|------------|-----|-------|------|-------|
|              | CPM        | RBS        | RTC      | TTL        |              |            |     |       |      |       |
| 2. Feb       | 0          | 0          | 0        | 0          | 0            | 0          | 0   | 0     | 0    |       |
| 3. March     | 0          | 0          | 0        | 0          | 0            | 0          | 0   | 0     | 0    |       |
| 4. April     | 1          | 38         | 0        | 39         | 3613         | 34         | 539 | 14710 | 495  | 15744 |
| 5. May       | 2          | 39         | 0        | 41         | 3580         | 17         |     |       |      |       |
| 6. June      | 0          | 30         | 1        | 31         | 1023         | 12         |     |       |      |       |
| 7. July      | 68         | 114        | 2        | 184        | 4740         | 233        |     |       |      |       |
| 8. Aug       | 134        | 100        | 0        | 234        | 1676         | 177        |     |       |      |       |
| 9. Sept      | 1          | 9          | 0        | 10         | 64           | 22         |     |       |      |       |
| 10. Oct      | 0          | 0          | 0        | 0          | 14           | 0          |     |       |      |       |
| <b>TOTAL</b> | <b>206</b> | <b>330</b> | <b>3</b> | <b>539</b> | <b>14710</b> | <b>495</b> |     |       |      |       |

Equipment maintenance for the PNM Fish Passage, closed river doors when the river rose above 7,000 cfs. - Effectively cleanout debris trapped in the second screen. This was done when both biologist were present and river was not flowing through the channels.

The limiting switch was a small concern in the opening of the season, however, the install of a spacer has therefore corrected the placement of the switch.

The chain that the screen brushes sit on has had a bit of slack for time to time, eventually folded over on itself – repaired.

PNM installed some safety/ hand rails at the facility was installed by PNM Welders That project was completed in spring of this year.

## A2. 2018 DATA PNM Weir Fish Passage

Table 2. Includes 2018 fish total caught and processed

Opened June 28 – November 1, 2018

This year was the start of the Flow- through Efficiency Study that will continue until agreed upon

|              | NTV         |            | T/E        |           |          | NNTV      |           |          |          |          |          |          |          |          |          |          |          |          |             |
|--------------|-------------|------------|------------|-----------|----------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|
|              | FMS         | BHS        | CPM        | RZB       | RTC      | BBH       | CCF       | BRT      | RBT      | CCP      | WHS      | GRS      | SMB      | LMB      | FHM      | BLG      | Other    |          | Other       |
| JUNE         | 17          | 29         | 5          | 0         | 0        | 2         | 0         | 0        | 0        | 0        | 1        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 54          |
| JULY         | 1293        | 454        | 136        | 43        | 3        | 34        | 51        | 1        | 0        | 1        | 2        | 0        | 1        | 2        | 4        | 0        | 0        | 6        | 2031        |
| AUG          | 187         | 44         | 38         | 25        | 0        | 2         | 1         | 0        | 0        | 0        | 1        | 0        | 2        | 0        | 0        | 1        | 0        | 1        | 302         |
| SEPT         | 69          | 26         | 4          | 9         | 0        | 1         | 4         | 0        | 0        | 1        | 3        | 1        | 4        | 1        | 0        | 0        | 0        | 0        | 123         |
| OCT          | 11          | 26         | 0          | 10        | 0        | 0         | 0         | 0        | 0        | 1        | 1        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 48          |
| <b>TOTAL</b> | <b>1577</b> | <b>579</b> | <b>183</b> | <b>87</b> | <b>3</b> | <b>39</b> | <b>56</b> | <b>1</b> | <b>0</b> | <b>3</b> | <b>8</b> | <b>1</b> | <b>7</b> | <b>3</b> | <b>4</b> | <b>1</b> | <b>0</b> | <b>7</b> | <b>2558</b> |

  

|              | T/E Fish   |           |          |            | NTV         |            | T/E | NTV  | NNTV | TTL  |
|--------------|------------|-----------|----------|------------|-------------|------------|-----|------|------|------|
|              | CPM        | RZB       | RTC      | TTL        | NTV         | NNTV       |     |      |      |      |
| JUNE         | 5          | 0         | 0        | 5          | 46          | 3          | 273 | 2156 | 130  | 2558 |
| JULY         | 136        | 43        | 3        | 182        | 1747        | 102        |     |      |      |      |
| AUG          | 38         | 25        | 0        | 63         | 231         | 8          |     |      |      |      |
| SEPT         | 4          | 9         | 0        | 13         | 95          | 15         |     |      |      |      |
| OCT          | 0          | 10        | 0        | 10         | 37          | 2          |     |      |      |      |
| <b>TOTAL</b> | <b>183</b> | <b>87</b> | <b>3</b> | <b>273</b> | <b>2429</b> | <b>130</b> |     |      |      |      |

May 1 & 2 CPM PIT TAG Retention Study at PNM Weir – concluded when sump pump motor burned out

May 11 – PIT Antenna cable was pulled from reader, needed to be repaired - Repaired complete

June 26 – Substrate was installed with P.O. collaboration

New sump pump and 2 new trash rack motors installed for season

COLORADO forest fires brought silt, mud, ash and other large debris, lots of channel cleaning. Very low fish detections and passage counts due large debris

Aug 31 – UDWR CPM Muscle plugs (4 plugs) sample taken

After season was concluded on October 2018, the south river screen was lifted and water was allowed to flow thru throughout the winter. A wagon wheel antenna was set in place inside the south channel for fish detection.



### A3. 2019 DATA PNM Weir fish Passage

Table 3. Includes 2018 fish total caught and processed

Opened June 26 – October 31, 2019

|              | NTV         |             | T/E        |           |          | NNTV     |            |          |          |          |           |          |          |          |          |          |          |          |             |
|--------------|-------------|-------------|------------|-----------|----------|----------|------------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-------------|
|              | FMS         | BHS         | CPM        | RZB       | RTC      | BBH      | CCF        | BRT      | RBT      | CCP      | WHS       | GRS      | SMB      | LMB      | FHM      | BLG      | Other    | Other    |             |
| JUNE         | 29          | 34          | 0          | 3         | 0        | 0        | 0          | 0        | 1        | 1        | 0         | 0        | 0        | 0        | 0        | 0        | 0        | 1        | 69          |
| JULY         | 1141        | 566         | 14         | 25        | 0        | 2        | 208        | 1        | 1        | 7        | 14        | 0        | 0        | 1        | 0        | 2        | 0        | 0        | 1982        |
| AUG          | 583         | 419         | 105        | 37        | 0        | 4        | 556        | 1        | 0        | 0        | 2         | 1        | 0        | 0        | 0        | 0        | 0        | 0        | 1708        |
| SEPT         | 53          | 72          | 3          | 13        | 0        | 2        | 15         | 0        | 0        | 1        | 1         | 0        | 1        | 0        | 0        | 0        | 1        | 0        | 162         |
| OCT          | 42          | 245         | 0          | 6         | 0        | 0        | 0          | 0        | 0        | 0        | 0         | 0        | 1        | 0        | 0        | 0        | 0        | 0        | 294         |
| <b>TOTAL</b> | <b>1848</b> | <b>1336</b> | <b>122</b> | <b>84</b> | <b>0</b> | <b>8</b> | <b>779</b> | <b>2</b> | <b>2</b> | <b>9</b> | <b>17</b> | <b>1</b> | <b>2</b> | <b>1</b> | <b>0</b> | <b>2</b> | <b>1</b> | <b>1</b> | <b>4215</b> |

  

|              | T/E Fish   |           |          |            | NTV         |            | T/E | NATIVE | NNTV | TTL  |
|--------------|------------|-----------|----------|------------|-------------|------------|-----|--------|------|------|
|              | CPM        | RZB       | RTC      | TTL        | NTV         | NNTV       |     |        |      |      |
| JUNE         | 0          | 3         | 0        | 3          | 63          | 3          | 206 | 3184   | 825  | 4215 |
| JULY         | 14         | 25        | 0        | 39         | 1707        | 236        |     |        |      |      |
| AUG          | 105        | 37        | 0        | 142        | 1002        | 564        |     |        |      |      |
| SEPT         | 3          | 13        | 0        | 16         | 125         | 21         |     |        |      |      |
| OCT          | 0          | 6         | 0        | 6          | 287         | 1          |     |        |      |      |
| <b>TOTAL</b> | <b>122</b> | <b>84</b> | <b>0</b> | <b>206</b> | <b>3184</b> | <b>825</b> |     |        |      |      |

Jan 20 – Debris pole at front intake was installed – antenna attached

Baffles were installed in the south channel.

August 2 – NNDFW staff started collecting CPM Fin Clips for Genetics USFWS - SNARCC

Aug 19 - SNARCC CPM > 400mm Fin Clips 92 fin clips total

48 individuals < 400 mm no samples taken

44 individuals > 400 mm (48%) samples taken

19 CPM in 400 mm size class– 43%

23 CPM in 500 mm size class– 52%

1 CPM in 600 mm size class – 2%

1 CPM in 700 mm size class – 2%

August 31 – Started CPM muscle plugs from >400mm – UDWR Data Collection

#### A4. 2020 DATA PNM Weir fish Passage

Table 4. Includes 2018 fish total caught and processed also included below the table are the PIT tagged Flannemouth sucker and Bluehead sucker  
Opened June 9 – November 2, 2020

| 2020         | NTV         |             | T/E        |           |          | NNTV      |           |           |          |           |           |          |           |          |          |          |          |          |             |  |
|--------------|-------------|-------------|------------|-----------|----------|-----------|-----------|-----------|----------|-----------|-----------|----------|-----------|----------|----------|----------|----------|----------|-------------|--|
|              | FMS         | BHS         | CPM        | RZB       | RTC      | BBH       | CCF       | BRT       | RBT      | CCP       | WS        | GRS      | SMB       | LMB      | FHM      | BLG      | Other    | Other    |             |  |
| JUNE         | 331         | 331         | 64         | 0         | 0        | 7         | 17        | 2         | 1        | 4         | 3         | 0        | 1         | 0        | 1        | 0        | 0        | 0        | 762         |  |
| JULY         | 612         | 886         | 74         | 3         | 1        | 0         | 17        | 18        | 0        | 1         | 3         | 3        | 1         | 1        | 0        | 0        | 0        | 0        | 1620        |  |
| AUG          | 369         | 350         | 134        | 2         | 0        | 7         | 36        | 0         | 1        | 7         | 2         | 0        | 2         | 0        | 0        | 0        | 0        | 0        | 910         |  |
| SEPT         | 373         | 382         | 0          | 2         | 0        | 1         | 0         | 0         | 0        | 10        | 3         | 0        | 5         | 0        | 0        | 0        | 0        | 0        | 776         |  |
| OCT          | 78          | 133         | 0          | 8         | 0        | 0         | 0         | 0         | 0        | 1         | 0         | 0        | 2         | 0        | 0        | 0        | 0        | 0        | 222         |  |
| NOV          | 5           | 11          | 0          | 0         | 0        | 0         | 0         | 0         | 0        | 0         | 0         | 0        | 0         | 0        | 0        | 0        | 0        | 0        | 16          |  |
| <b>TOTAL</b> | <b>1768</b> | <b>2093</b> | <b>272</b> | <b>15</b> | <b>1</b> | <b>15</b> | <b>70</b> | <b>20</b> | <b>2</b> | <b>23</b> | <b>11</b> | <b>3</b> | <b>11</b> | <b>1</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>4306</b> |  |

  

|              | T/E        |           |          |            | TTL         | NTV        |      | NNTV | T/E  | NTV | NNTV | 4306 | S.Open    | 6\2\2020 |      |
|--------------|------------|-----------|----------|------------|-------------|------------|------|------|------|-----|------|------|-----------|----------|------|
|              | CPM        | RZB       | RTC      | TTL        |             | NTV        | NNTV |      |      |     |      |      |           |          |      |
| June         | 64         | 0         | 0        | 64         | 662         | 36         |      |      |      |     |      | Open | 6\9\2020  |          |      |
| July         | 74         | 3         | 1        | 78         | 1498        | 44         |      |      |      |     |      | Open | 11\2\2020 |          |      |
| August       | 134        | 2         | 0        | 136        | 719         | 55         |      |      |      |     |      |      |           |          |      |
| Sept         | 0          | 2         | 0        | 2          | 755         | 19         |      | END  | PLUS | NTV | TNTV | PLUS | NN        | TTL      | 4306 |
| Oct          | 0          | 8         | 0        | 8          | 211         | 3          |      |      |      |     |      |      |           |          |      |
| Nov          | 0          | 0         | 0        | 0          | 16          | 0          |      |      |      |     |      |      |           |          |      |
| <b>Total</b> | <b>272</b> | <b>15</b> | <b>1</b> | <b>288</b> | <b>3861</b> | <b>157</b> |      |      |      |     |      |      |           |          |      |

BOR/BioMark install and bury antenna cable in Feb. - install another cable March 21  
2 water cannons installed and in use this season cutting down on manual cleaning

MARCH COVID PRECAUTIONS ALLOW 1-2 ppl at worksite

Screen removal for flow through study & P.O. help install more cobble to substrate area

March 8 -13: Guido, Bogaard PIT Study STARTS at PAIUTE FALLS FMS, BHS

PIT Tagged Flannemouth sucker

7-30-2020 - Recap: 3DD.003BC0D365

TL: 504mm, SL: 435mm, WT: 1200g

Not tuberculated, Not ripe, Released alive

PIT tagged Bluehead sucker

10-11-2020 – Recap: 3DD.003BC0CE55

TL: 360mm, SL: 310mm, WT: 440g

Not tuberculated, Not ripe, Released alive

During the COVID SHUT DOWN is when the antenna stopped detections due to fuses shorting out. Battery charger was set up to recharge everyday by NNDFW staff. Issue was repaired and detections continued.