

# Mora National Fish Hatchery

August 2016

## Bacterial Kidney Disease at Mora National Fish Hatchery

The Southwestern Fish Health Center contacted the Hatchery on August 16<sup>th</sup> to confirm the presence of *Renibacterium salmoninarum*, Bacterial Kidney Disease (BKD), in the Brood Year 2016 Main Diamond Gila trout. The Main Diamond lot was sampled during the routine annual fish health inspection on July 19, 2016. Since the 2016 Hatchery Gila trout survival rates have been at all-time highs, and all tested fish appeared healthy, the presence of BKD antibodies is considered a sub-clinical exposure. BKD exposure is detected by Direct Fluorescence Antibody Testing (DFAT) and confirmed by nested Polymerase Chain Reaction (PCR). The origin of the BKD disease was suspected as vertical transmission from the 2013 Main Diamond Brood Stock fish spawned in the Spring of 2016.

BKD has been recognized as a serious disease in salmonid fishes since the 1930s. (Elliot 2014). Of Salmonid species, BKD is most common in Spring Chinook, Coho, and Sockeye Salmon. Brook trout are the next most susceptible to BKD, followed by brown trout and rainbow trout (*Onchorynchus mykiss*). Some steelhead (*Onchorynchus sp.*) are considered resistant to BKD (Warren 2002). Sucker species (*Catostomus sp.*) have been found to harbor BKD, as well (NOAA 2012). BKD can cause mortality in both hatchery and wild salmonid populations, but consuming infected fish does not pose a threat to human health. Clinical signs in salmonids include exophthalmia, petechial hemorrhages of the skin, and off-white nodules in the kidney (Elliot 2012).

In the Gila Wilderness area, BKD has been documented in the Whiskey Creek lineage, and in brown trout and *Onchorynchus* species in Iron, McKenna, White creeks and the West Fork Gila River drainage. In the wild, BKD is not a likely threat to Gila Trout Recovery efforts because of limited distribution, low occurrence within trout populations, and lack of any clinical evidence of the disease in Gila Trout (Federal Register 2006). However, this is the first time BKD has been found at the Hatchery.

The Hatchery routinely imports wild Gila trout and *Catostomus* species for broodstock management and polyculture purposes. These fish are kept in isolation facilities and quarantined prior to utilization as broodstock or polyculture. During spawning operations, ovarian fluid samples are taken and tested for BKD infection to identify vertical transmission to offspring. Since ovarian fluid testing is not fail-safe, there is always some risk of BKD exposure assumed to meet broodstock management and polyculture goals.



As a result of the positive BKD finding, the Hatchery swiftly destroyed all 2016 Main Diamond Gila trout and the 2013 year class of Main Diamond broodstock. This action was necessary to reduce the risk on the facility. In addition, the Hatchery has now been classified as BKD positive which means that no fish will be available for stocking for a year. After a year, the Gila trout will be re-tested for BKD. If the result is negative, the Hatchery will be reclassified as BKD suspect. After a second year of negative test results, the Hatchery will regain its Class A classification and can resume Recovery stocking operations.

The Hatchery is working with the Fish Health Center to develop adaptive management strategies to control BKD and other infectious diseases at the Hatchery. In addition, the Fish Health Center will be testing wild Main Diamond samples to determine prevalence of BKD in the Wild. In the interim, the Hatchery will concentrate on continuing development of a healthy and diverse broodstock to support Gila Trout Recovery in the future.

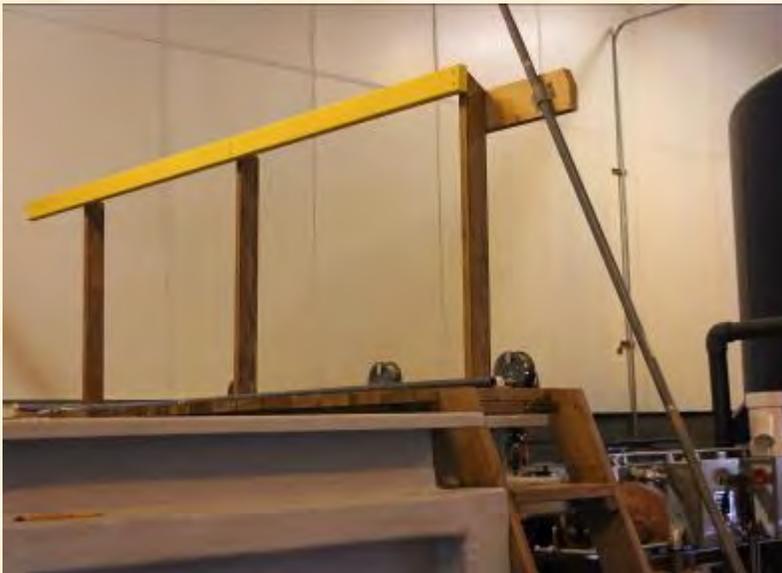
Elliot, D. G. 2012 1.3.1 Bacterial Kidney Disease. In AFS-FHS (American Fisheries Society-Fish Health Section). FHS blue book: suggested procedures for the detection and identification of certain finfish and shellfish pathogens, 2014 edition. Accessible at: <http://afsfs.org/bluebook/bluebook-index.php>.

Elliot, D.G. 2014. Vaccination against bacterial kidney disease: Chapter 22. Accessed at: <https://pubs.er.usgs.gov/publication/70101338>

Federal Register. 2006. Reclassification of the Gila Trout (*Oncorhynchus gilae*) From Endangered to Threatened; Special Rule for Gila Trout in New Mexico and Arizona. Rule by Fish and Wildlife Service on 07/18/2006. Accessible at: <https://www.federalregister.gov/articles/2006/07/18/06-6215/endangered-and-threatened-wildlife-and-plants-reclassification-of-the-gila-trout-oncorhynchus-gilae>

NOAA (2012). *Renibacterium (Corynebacterium) salmoninarum* USGS Nonindigenous Aquatic Species Database, Gainesville, FL, and NOAA Great Lakes Aquatic Nonindigenous Species Information System, Ann Arbor, MI. Revision Date: 9/27/2012 Accessed at: <http://nas.er.usgs.gov/queries/GreatLakes/FactSheet.aspx?NoCache=3%2F7%2F2014+3%3A33%3A57+PM&SpeciesID=2736&State=&HUCNumber=DHuron>

Warren. J.W. 2002. 21 Bacterial Kidney Disease. Integrated Fish Health Management in the Great Lakes Basin. Accessible at: [http://www.glfc.org/pubs/SpecialPubs/sp83\\_2/](http://www.glfc.org/pubs/SpecialPubs/sp83_2/)



## Sump Walkways

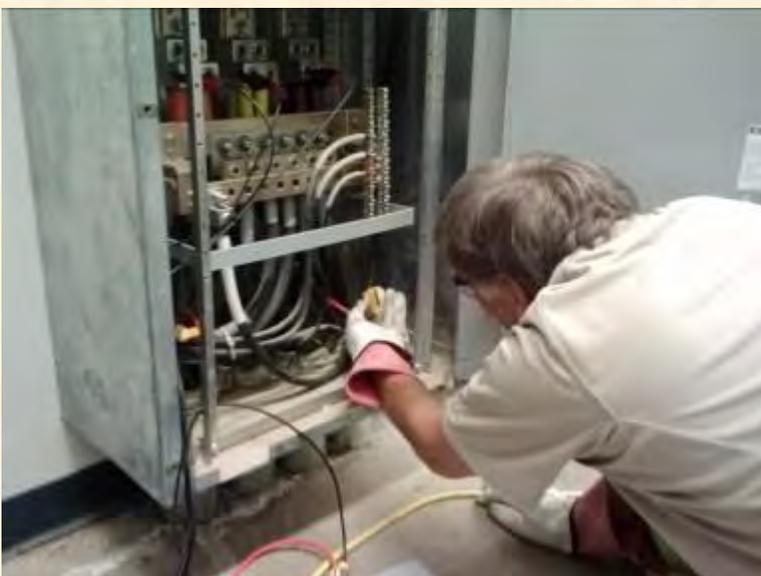
Volunteer Sandy Kalb designed and built three new walkways on top of the raceway sumps that allow hatchery staff to access and clean the entire sump. Sandy incorporated several safety features including handrails and a backstop to prevent personnel from slipping off the back of the walkway.

## Broodstock PIT tagging

Hatchery staff began PIT tagging and genetically sampling the 2016 South Diamond broodstock during August. The fish are weighed and measured, a fin clip (adipose) is removed for genetic testing, and a PIT (Passive Integrated Transponder) tag is inserted in the back near the dorsal fin. This then provides a “name”, or 16 digit identifier for every brood fish on the station.



Photo Credit: Tim Christian



## Electric Monitor Installed

Maintenance Worker Richie Garcia installed an electric monitor on the power lines coming into the hatchery during August. The facility has been experiencing numerous flow alarms throughout the hatchery on the Aquamanager system. Staff has pinpointed the alarms to insufficient power being provided to the pumps. Current testing is to determine if the power fluctuations are from the electrical co-op or on the hatchery side.



## Tanks Transferred

Twenty-four 36 by 36 inch circular tanks were transferred to the Gavin's Point National Fish Hatchery in Region 6 during August. Hatchery staff were able to nest these tanks, thereby greatly reducing the shipping charges. These tanks will be used to rear paddlefish at their new station.

## VIE Tagging

Hatchery staff tagged approximately 3,400 fish with a VIE (Visible Implant Elastomer) tag. The fish were a subset of the fish used in DFP Colleen Grant's velocity study. They were tagged directly behind the eye, an area on trout species that has very little pigment and is thus easy to identify. In addition the fish were also fish clipped as a secondary measure for identifying hatchery source fish.



## Tim and Cozette Depart

Volunteers Tim and Cozette Christian finished up their time at Mora NFH on August 31. The staff held an outdoor barbeque as a thanks for their hard work where they were presented with a certificate of appreciation for their service. The Christian's were instrumental this summer by maintaining and expanding the pollinator garden, assisting with maintenance tasks at the residences and hatchery buildings, and providing tours to the public.



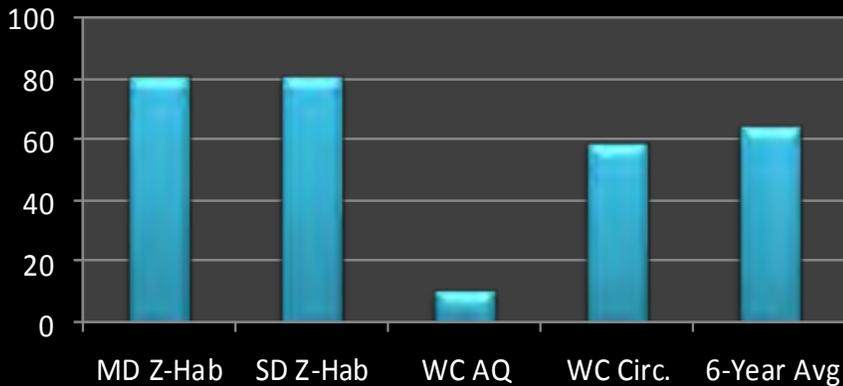
# Stock on Hand

Production Lineage	Brood Year	Purpose	Location	Number	Mortality	Sample (fpp)	Length (in)	Biomass (lbs)
Main Diamond	2014	Brood	Raceway 1B	433**	11	0.6	16.1	723
	2014	Wild	VC East 2	65	0	3.0	9.2	22
	2015	Brood	Raceway 1T	816	2	2.8	9.5	291
	2016	Brood	ZHAB, 30	0	1,877*	0	0	0
	2016	Recovery	SR:1,7 250's, 30	0	22,464*	0	0	0
	2016	4D	SR, 380, 2500	0	16,059*	0	0	0
	<b>Total</b>				<b>1,314</b>	<b>40,413</b>	<b>1.3</b>	<b>12.4</b>
South Diamond	2014	Brood	Raceway 2B	499	3	0.6	16.1	833
	2015	Brood	Raceway 2T	720	4	2.5	10.0	288
	2016	Brood	ZHAB, 30	1,545	8	71	3.3	22
	2016	Recovery	SR, 2500	21,257**	163	44	3.9	489
	2016	4D	SR, 30	0	10,693*	0	0	0
	<b>Total</b>				<b>24,021</b>	<b>10,871</b>	<b>14.7</b>	<b>5.5</b>
Whiskey Creek	2014	Brood	Raceway 3B	430	3	0.8	16.1	538
	2015	Brood	Raceway 3T	524	6	2.8	9.5	187
	2015	Recovery	Raceway 4T	748	2	2.0	10.5	374
	2016	Brood	AQ	787	4	71	3.3	11
	2016	Recovery	250, 30	993	7	71	3.3	14
	<b>Total</b>				<b>3,482</b>	<b>22</b>	<b>3.1</b>	<b>9.3</b>
Spruce Creek	10/13/14	Wild	Spruce Creek 2	36	0	0.8	~13	34
	2014	Brood	Spruce Creek 1	33	1	0.6	15.7	55
	2016	Brood	C8	28	0	71	3.3	1
	<b>Total</b>			<b>97</b>	<b>1</b>	<b>1.1</b>	<b>13.2</b>	<b>90</b>
Iron Creek	2011	Wild	Spruce Creek 3,4	25	0	0.6	16.1	42
	2013	Wild	VC East 3,4	91	0	4.0	8.1	23
	<b>Total</b>			<b>116</b>	<b>0</b>	<b>1.8</b>	<b>11.2</b>	<b>65</b>
<b>Total All Lineages</b>				<b>29,030</b>	<b>51,307</b>	<b>7.0</b>	<b>7.4</b>	<b>3,947</b>

\*Euthanized due to BKD, SD shared System 2. \*\* Inventory updated.

<b>BonyTail</b>	2011	Wild	Shady Acres	1,261	0	3.6	10.1	353
	<b>Total</b>			<b>1,261</b>	<b>0</b>	<b>3.6</b>	<b>10.1</b>	<b>353</b>

# Sac Fry to Fingerling Gila Survival



## Broodstock Survival

Prior to BKD euthanization, 2016 Gila Trout survival rates were some of the highest on record. However, comparing survival rates between differing rearing units yielded some interesting results. The new Z-Habitats out-performed the traditional aquarium and circular tanks by a wide margin. This was the first year of utilizing the Z-habitat systems for broodstock development, and the Hatchery was pleased with the results. In addition to the higher survival rates, the Z-habitats required 50% less cleaning than aquariums which reduced stress on the broodstock fish.

## Upcoming Events

- Colleen Grant's DFP position ends on September 2.
- Hatchery Staff assisting with the Little Creek Fish Collection September 14 and 15
- Hatchery Staff assisting with the Upper Langstroth Fish Collection September 23
- Hatchery Staff and Living Stream display at Valle de Oro NWR 3rd Anniversary Celebration on September 24
- Hatchery Staff and Living Stream display at the Concert for the Birds on the Las Vegas NWR on September 25.

## In Brief

Colleen Grant assisted biological staff at Bosque del Apache NWR with mouse trapping on August 1-3.

Hatchery staff attended the summer Gila Trout Recovery Team Meeting on August 4.

Daniel and Jeremiah returned to Eastern New Mexico University for the fall semester on August 12.

## Hatchery Staff

Nate Wiese, Project Leader  
Lori Casados, Admin. Assistant  
Jeff Conway, Fish Biologist  
Grant Langmaid, Fish Biologist  
Richie Garcia, Maintenance Worker  
Dustin Wagner Biological Technician  
Daniel Gallegos, Intern  
Jeremiah Olivas, Bio. Technician  
Colleen Grant, DFP Candidate  
Sandy Kalb, Volunteer  
Tim and Cozette Christian, Volunteer

## Contact Us

Mora NFH  
PO Box 689  
Highway 434 Mile Marker 2  
Mora, NM 87732  
575-387-6022  
575-387-9030 (fax)