Pacific Northwest
NATIONAL LABORATORY

PNNL-36381

Development of Hydropower Biological Evaluation Toolset (HBET)

V2.1.9 Release Notes for HBET

July 2024

Hongfei Hou, Daniel Deng, Aljon Salalila, Jun Lu

U.S. DEPARTMENT OF ENERGY

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

DISCLAIMER

PACIFIC NORTHWEST NATIONAL LABORATORY
operated by
BATTELLE
for the
UNITED STATES DEPARTMENT OF ENERGY
under Contract DE-AC05-76RL01830

Printed in the United States of America

Available to DOE and DOE contractors from
the Office of Scientific and Technical Information,
P.O. Box 62, Oak Ridge, TN 37831-0062
www.osti.gov
ph: (865) 576-8401
fox: (865) 576-5728
email: reports@osti.gov

Available to the public from the National Technical Information Service
5301 Shawnee Rd., Alexandria, VA 22312
ph: (800) 553-NTIS (6847)
or (703) 605-6000
email: info@ntis.gov
Online ordering: http://www.ntis.gov

Development of Hydropower Biological Evaluation Toolset (HBET)

V2.1.9 Release Notes for HBET

July 2024

Hongfei Hou
Daniel Deng
Aljon Salalila
Jun Lu

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory
Richland, Washington 99354

Summary

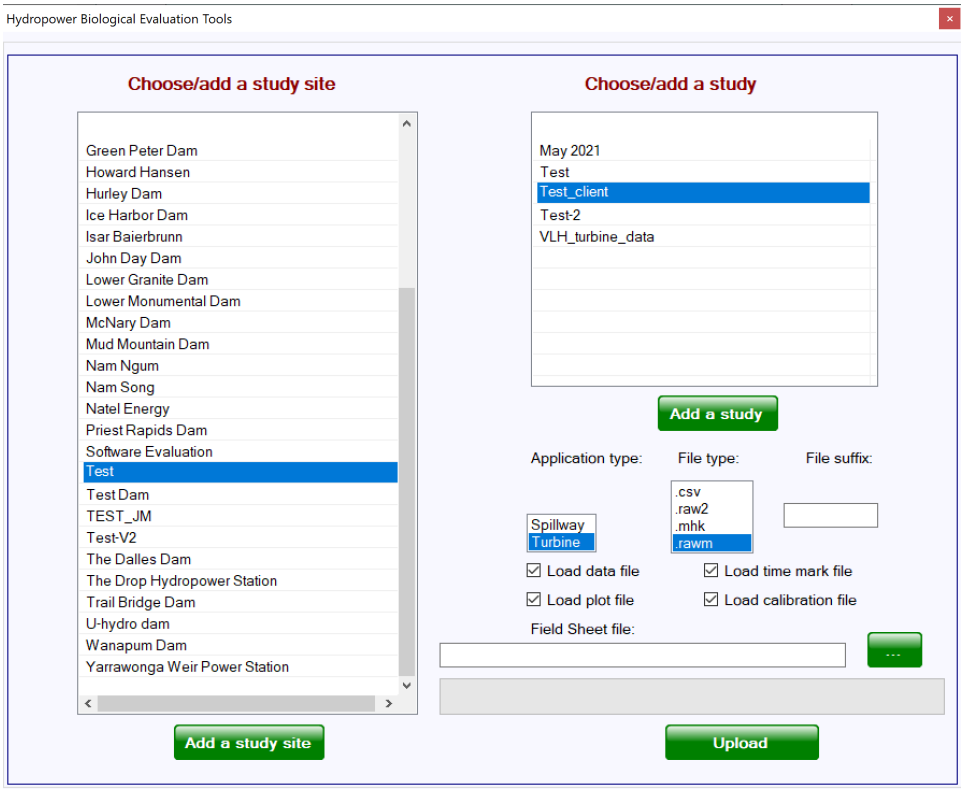
The following release notes reflect changes made to HBET for proposed changes to be released in July 2024. Notes are broken up into three sections: 1) Key Improvements, 2) Bug Fixes, and 3) Data Changes

- Key Improvements: primary features added and changes to existing features that affect the user experience.
- Bug Fixes: Issues discovered or reported that were fixed in the proposed work to be released.
- Data Changes: Any work done on the databases directly or the process to calculate data for the system.

1.1 Key Improvements:

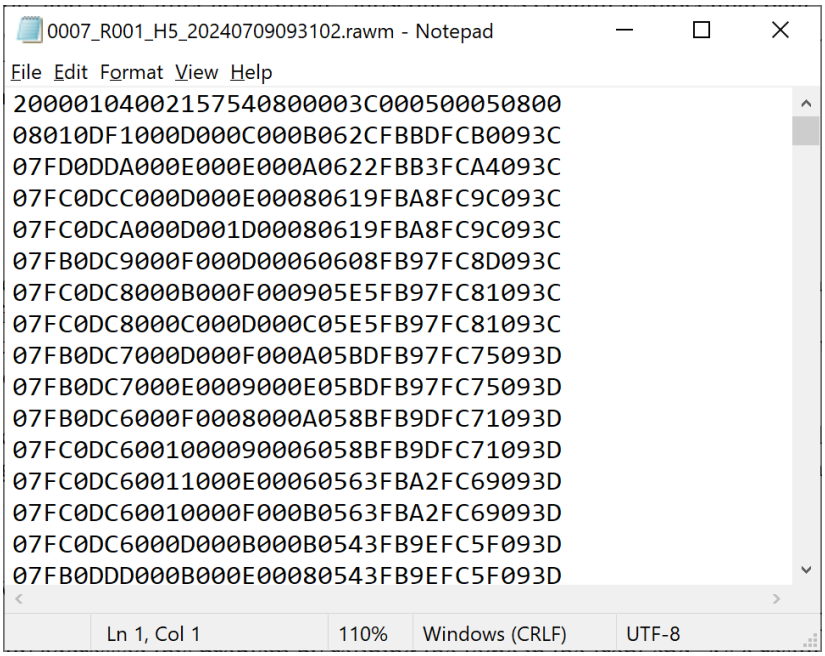
- Enhanced functionality to accommodate data collected using Sensor Fish Mini.
  Sensor Fish Mini, developed by PNNL in 2018 as a compact iteration of the Sensor Fish, is utilized to assess fish passage conditions and physical stressors in small hydraulic structures. Small hydro, comprising 89 percent of non-federal facilities with capacities under 30 megawatts, is the primary application area. Sensor Fish Mini captures acceleration, rotational velocities, orientation, pressure, and temperature data.

  PNNL upgraded the HBET by integrating functionality tailored for Sensor Fish Mini data. The latest version of HBET supports both raw data file format and comma-separated values (CSV) file format.

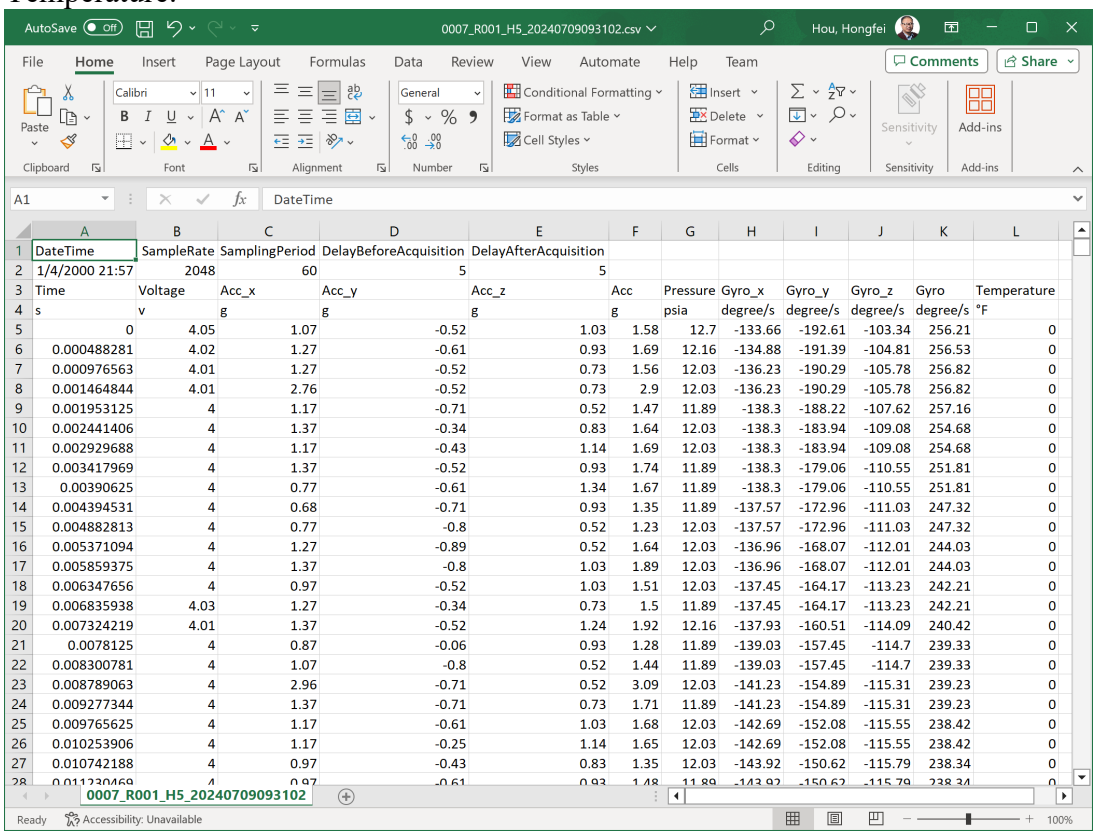


The raw data file commences with a line detailing Sensor Fish Mini settings used during data collection, including start date time, sample rate, sampling period, delay before acquisition, and delay after acquisition. Subsequent lines contain hexadecimal data, each

36 characters in length. These data are employed to compute nine measurements, each represented by four characters: pressure, voltage, accelerations in the X, Y, and Z axes, rotational speeds in the X, Y, and Z axes, and temperature.



The CSV file begins with Sensor Fish Mini settings in the first two rows, while measurement data starts from the fourth row. The file comprises 9 columns: time, voltage, Acc_x, Acc_y, Acc_z, Acc, Pressure, Gyro_x, Gyro_y, Gyro_z, Gyro, and Temperature.



	A	B	C	D	E	F	G	H	I	J	K	L
1	DateTime	SampleRate	SamplingPeriod	DelayBeforeAcquisition	DelayAfterAcquisition							
2	1/4/2000 21:57	2048	60	5	5							
3	Time	Voltage	Acc_x	Acc_y	Acc_z	Acc	Pressure	Gyro_x	Gyro_y	Gyro_z	Gyro	Temperature
4	s	v	g	g	g	g	psia	degree/s	degree/s	degree/s	degree/s	°F
5	0	4.05	1.07	-0.52	1.03	1.58	12.7	-133.66	-192.61	-103.34	256.21	0
6	0.000488281	4.02	1.27	-0.61	0.93	1.69	12.16	-134.88	-191.39	-104.81	256.53	0
7	0.000976563	4.01	1.27	-0.52	0.73	1.56	12.03	-136.23	-190.29	-105.78	256.82	0
8	0.001464844	4.01	2.76	-0.52	0.73	2.9	12.03	-136.23	-190.29	-105.78	256.82	0
9	0.001953125	4	1.17	-0.71	0.52	1.47	11.89	-138.3	-188.22	-107.62	257.16	0
10	0.002441406	4	1.37	-0.34	0.83	1.64	12.03	-138.3	-183.94	-109.08	254.68	0
11	0.002929688	4	1.17	-0.43	1.14	1.69	12.03	-138.3	-183.94	-109.08	254.68	0
12	0.003417969	4	1.37	-0.52	0.93	1.74	11.89	-138.3	-179.06	-110.55	251.81	0
13	0.00390625	4	0.77	-0.61	1.34	1.67	11.89	-138.3	-179.06	-110.55	251.81	0
14	0.004394531	4	0.68	-0.71	0.93	1.35	11.89	-137.57	-172.96	-111.03	247.32	0
15	0.004882813	4	0.77	-0.8	0.52	1.23	12.03	-137.57	-172.96	-111.03	247.32	0
16	0.005371094	4	1.27	-0.89	0.52	1.64	12.03	-136.96	-168.07	-112.01	244.03	0
17	0.005859375	4	1.37	-0.8	1.03	1.89	12.03	-136.96	-168.07	-112.01	244.03	0
18	0.006347656	4	0.97	-0.52	1.03	1.51	12.03	-137.45	-164.17	-113.23	242.21	0
19	0.006835938	4.03	1.27	-0.34	0.73	1.5	11.89	-137.45	-164.17	-113.23	242.21	0
20	0.007324219	4.01	1.37	-0.52	1.24	1.92	12.16	-137.93	-160.51	-114.09	240.42	0
21	0.0078125	4	0.87	-0.06	0.93	1.28	11.89	-139.03	-157.45	-114.7	239.33	0
22	0.008300781	4	1.07	-0.8	0.52	1.44	11.89	-139.03	-157.45	-114.7	239.33	0
23	0.008789063	4	2.96	-0.71	0.52	3.09	12.03	-141.23	-154.89	-115.31	239.23	0
24	0.009277344	4	1.37	-0.71	0.73	1.71	11.89	-141.23	-154.89	-115.31	239.23	0
25	0.009765625	4	1.17	-0.61	1.03	1.68	12.03	-142.69	-152.08	-115.55	238.42	0
26	0.010253906	4	1.17	-0.25	1.14	1.65	12.03	-142.69	-152.08	-115.55	238.42	0
27	0.010742188	4	0.97	-0.43	0.83	1.35	12.03	-143.92	-150.62	-115.79	238.34	0
28	0.011230469	4	0.97	-0.61	0.93	1.48	11.89	-143.92	-150.62	-115.79	238.34	0

1.2 Bug Fixes:

There are no bug fixes included in this release.

1.3 Data Changes:

There are no changes related to databases in this release.