ABSTRACT
This dataset includes modeled velocity and discharge at five communities in the middle Kuskokwim River region: Aniak, Chuathbaluk, Crooked Creek, Red Devil and Stony River. Modeled velocities and discharge represent daily averages calculated for the openwater season (OWS) from June 1 - October 18 over the 20 year period 2000-2019 using the raw data described below and included in this archive; full details of methodology are described in (Brown et al. submitted to Renewable Energy).

Raw data inputs to inform the modeling process include in-situ measurements of 1) discharge with an acoustic Doppler current meter (ADCP, 600kHz Workhorse Rio Grande by Teledyne RD Instruments) and a global positioning receiver (GPS, Trimble 5700, 5800 and R8) utilizing Real Time Kinematic (RTK) GPS mode over 1-2 days at each site in 2009 or 2010 (Ravens 2014), and 2) river stage with a water level logger (HOBO U20-001-01 by Onset) over 2-9 weeks at each site (Ravens 2014), 3) in addition to a 20 year long-term discharge record collected at the USGS stream gage site in Crooked Creek (USGS 2016).

Raw data (discharge and stage) are included in this archive for two additional communities: Lower Kalskag and Sleetmute, where modeled velocities were not calculated due to equipment failure or loss. The USGS stream gage data at Crooked Creek (USGS 2016) and stream gage methodology (Turnipseed and Sauer 2010) are publicly available online, so the data are not duplicated here.

FILE ORGANIZATION
The data are organized into 2 main directories for 1) modeled and 2) raw data. Within the Modeled directory, there is one .zip file containing two .csv files and a README.txt described below. Within the Raw directory, there are seven .zip files, one for each site; each includes subdirectories for: 1) ADCP data, 2) HOBO data, and 3) transect locations. The file architecture is structured for ease of use with the proprietary software, WinRiver II (Teledyne RDI 2022) for post processing of ADCP data, as described below.

MODELED DATA
Within the file Modelled.zip, two comma delimited text files (with file extension .csv) contain a summary of discharge (Q) and velocity (V) data for all five locations in units of [m3/s] and [m/s], respectively. File

dimensions are 141 rows by 6 columns and include a header line to define the six variables: 1) the day of the year from June 1 - October 18; 2) Red Devil; 3) Stony River; 4) Chuathbaluk; 5) Aniak; and 6) Crooked Creek.
- Modelled.zip - contains these files:
- Q.csv - discharge data [m3/s]
- V.csv - velocity data [m/s]
- README.txt - defines variables, units, and header line for both .csv files
- Raw data
- Within the Raw directory, there is one zip file for each community:
- Aniak.zip
- Chuathbaluk.zip
- Crooked_Creek.zip
- Lower_Kalskag.zip
- Red_Devil.zip
- Sleetmute.zip
- Stony_River.zip

Each zip file contains three subdirectories for each type of raw data:
- Location_Raw_ADCP - folder contains ADCP data
- Location_Pressure Sensor - folder contains HOBO data
- Location_Transects_Location - folder contains a Google Earth transect location data

Also included in each zip file are a ReadMe.txt file describing the folder structure and a Summary.csv file containing a summary of all the ADCP transect data at that site:
- ReadMe.txt - describes folder structure
- *Summary.csv file - summary of ADCP transects

RAW ADCP DATA
The ADCP file architecture is structured for post processing ADCP data with the proprietary software, WinRiver II by Teledyne RDI (2022). There is a subdirectory for each measurement (.mmt file), and each measurement contains one or more measured transects (.PD0 file):
- *.mmt - measurement file produced by WinRiver II
- *.PD0 - raw data downloaded from ADCP
- *.PD0.nc - file produced by WinRiver II from the .PD0
- *GPS.TXT - file containing latitude and longitude positions that was produced by external navigation device linked to WinRiver II via a serial communication port.

The Summary.csv file contains all of the ADCP data at that site that were extracted with Winriver II software (v2.24); a complete explanation of the variables can be found in the Winriver II User Guide (Teledyne RDI 2022). File dimensions are N rows by 27 columns, and include two header lines to define the 27 variables and units, where N represents the total number of ADCP transects measured at that site.

- Transect = transect name
- Start Bank = indicates whether transect started at the left of right bank
- # Ens.= total number of ensembles in this transect
- Date = date recorded in local time AKDT (UTC-8)
- Start Time = time recorded in local time AKDT (UTC-8)
- Total Q = total discharge (m3/s)
- Delta Q = change in discharge between transects (%)
- Top Q = estimated discharge for velocity profile top (m3/s)
- Meas. Q = measured discharge (m3/s)
- Bottom Q = estimated discharge for velocity profile bottom (m3/s)
- Left Q = estimated near-shore discharge for left bank (m3/s)
- Left Dist. = distance to left bank (m)
- Right Q = estimated near-shore discharge for right bank (m3/s)
- Right Dist. = distance to right bank (m)
- Width = transect width (m)
- Total Area = transect area (m2)
- Q/Area = transect discharge over area (m/s)
- Boat Speed = average boat speed (m/s)
- Flow Speed = average flow speed (m/s)
- Flow Dir. = average flow direction (?)
- End Time = time recorded in local time AKDT (UTC-8)
- Duration = total amount of time elapsed during this transect (s)
- Start Ens. = sequential number of the first ensemble of this transect
- End Ens. = sequential number of the last ensemble of this transect
- Velocity = indicates how velocity magnitude was calculated from 3 possible sources: 1) ADCP Bottom-Track velocity, 2) Differential GPS position from the NMEA GCA string, or 3) GPS velocity from NMEA 0183 VTG string.
- Depth = indicates how river depth was calculated from 3 possible sources: 1) bottom track (BT), 2) vertical beam (VB), and 3) depth sounder depth.
- Notes = indicates any data quality issues with the transect:
- Reversed transect = the operator chose the incorrect bank side (right or

left) at the beginning of transect
- Failed transect = insufficient number of ensembles, transect was probably aborted by operator

RAW PRESSURE SENSOR DATA
Two files for each site include a summary of the pressure sensor data (.csv) that was produced from the raw data file (.hobo) within the proprietary software, HOBOware (v3.7.23 Onset 2022a):
- *.csv
- *.hobo

File dimensions for the .csv files are N rows by 5 columns, with 2 header rows defining the location, variables and units:
- # = observation number
- Date Time = date and time, indicates timezone
- Abs Pres = absolute pressure (kPa)
- Temp = temperature (?C)
- Batt = remaining battery power (v)

where N is determined by the length of deployment and measurement interval (15 mins). Absolute pressure includes both water level and atmospheric pressure. The serial number (S/N) for that HOBO water level logger is included in the header.

RAW LOCATION DATA
Geographic data for each transect are stored as Keyhole Markup Language (KML) files. The KML files were created using the free software GPSBabel (V. 1.8.0 2022) by converting the GPS NMEA text files acquired with WinRiver II (Teledyne RDI 2022). There are multiple .kml files within the Location directory, with names corresponding to the ADCP transect numbers listed in the *Summary.csv file described above.

REFERENCES
1) Brown, E.J, King, A.L., Duvoy, P.X., Trochim, E., Kasper, J.L., Wilson, M. and Ravens, T.M., Site Suitability Analysis of Hydrokinetic River Energy Resources at Community Microgrids on the Kuskokwim River, Alaska. Submitted to Renewable Energy, Oct 2022. Available at SSRN: https://ssrn.com/abstract=4271329 or http://dx.doi.org/10.2139/ssrn.4271329
2) Ravens, T.M. (2014) Alaska In-River Hydrokinetic Energy Resources. University of Alaska, Anchorage. 1-51.

3) Turnipseed, D.P. and V.B. Sauer (2010) Discharge measurements at gaging stations: U.S. Geological Survey Techniques and Methods book 3, chap. A8, 87 p. accessed online 11/22/22 http://pubs.usgs.gov/tm/tm3-a8/
4) U.S. Geological Survey (2016) National Water Information System data (Water Data for the Nation), Site no. 1530400 Kuskokwim River at Crooked Creek, accessed online 9/30/20 https://waterdata.usgs.gov/nwis/inventory?site_no=15304000

LINKS TO SOFTWARE

The ADCP file architecture is structured for ease of use with the proprietary software, WinRiver II (Teledyne RDI 2022) for post processing of ADCP data. Alternatively, ADCP data files can be opened and processed with the Marine and Hydrokinetic Toolkit (MHKit), an open-source marine renewable energy software developed in Python and Matlab and available online (GitHub 2019, PRIMRE 2019).

The HOBO pressure sensor data files can accessed with the proprietary software, HOBOware (Onset 2022a) and User?s Guide (Onset 2022b).

Geographic data for each transect are stored as Keyhole Markup Language (KML) files. The KML files were created using the free software GPSBabel (V. 1.8.0 2022) by converting the GPS NMEA text files acquired with WinRiver II (Teledyne RDI 2022). Due to the large number of points, it is recommended to import KML files into the free open source geographic software, QGIS (2022) rather than opening with an Earth browser such as Google Earth (2022).

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5) Onset (2022b) HOBOware User?s Guide. 226pp. accessed online 11/22/22 https://www.onsetcomp.com/resources/documentation/12730-hoboware-users-guide
6) PRIMRE (2019) Portal and Repository for Information on Marine and

Renewable Energy, Signature Projects, MHKit. accessed online 11/22/22 https://openei.org/wiki/PRIMRE/Signature_Projects/MHKiT
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8) Teledyne RD Instruments (2022) WinRiver II Software User?s Guide. P/N 957-6231-00 (August 2022) accessed online 11/22/22 http://www.teledynemarine.com/rdi/support