Data Set Citation

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Segura C , Bladon K , Hatten J , Jones J , Hale C , Ice G , and Souder J.
Long-term effects of forest harvesting on summer low flow deficiets in the Coast Range of Oregon
GuenPatty.8.1

General Information

Title:	**Long-term effects of forest harvesting on summer low flow deficiets in the Coast Range of Oregon**
Identifier:	GuenPatty.8.1
Abstract:	We examined long-term changes in daily streamflow associated with forestry practices with two datasets (this one and the original Alsea Streamflow dataset(1972)) over a 60-year period (1959–2017) in the Alsea Watershed Study, Oregon Coast Range, Pacific Northwest, USA. In this contemporary period, 2006 to 2017 (12 water years), data were collected at 10-minute intervals, including three to eight years of pre-harvest data rating curves were developed. Based 40 to 55 stage-discharge data points collected for each watershed. Each watershed has datasets describing the paired stage heights at both pre and post-harvest periods, the corrected stages based on reference and electronic readings, and flows calculated based upon the rating curve and stage heights. All measurements are in feet (ft), meters (m), cubic feet per second (cfs), or cubic meters per second (cms).
Keywords:	58–Riparian areas-- Management 59–Stream Measurements 60–Logging 61–Water levels-- Effect of logging on

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Data Set Characteristics

Geographic Region:

Geographic Description:	Flynn Creek Basin, Hydrologic units (HUC14): 17100205030201
Bounding Coordinates:	West: -123.891211 degrees East: -123.734109033 degrees North: 44.559185 degrees South: 44.532827 degrees

Geographic Region:

Geographic Description:	Deer Creek Basin, HUC14: 1417100205030201
Bounding Coordinates:	West: -123.872247 degrees East: -123.842568 degrees North: 44.556961 degrees South: 44.525119 degrees

Geographic Region:

Geographic Description:	Needle Branch Creek Basin, HUC14: 17100205030202
Bounding Coordinates:	West: -123.863906 degrees East: -123.841675 degrees North: 44.52874 degrees South: 44.508146 degrees

Geographic Region:

Geographic Description:	Flynn Creek USGS Stream Gage
Bounding Coordinates:	West: -123.87831 degrees East: -123.75443169 degrees North: 44.535218 degrees South: 44.535218 degrees

Geographic Region:

Geographic Description:	Deer Creek USGS Stream Gage
Bounding Coordinates:	West: -123.853275 degrees East: -123.729421725 degrees North: 44.538629 degrees South: 44.538629 degrees

Geographic Region:

Geographic Description:	Needle Branch USGS Stream Gage
Bounding Coordinates:	West: -123.85647 degrees East: -123.73261353 degrees North: 44.509812 degrees South: 44.509812 degrees

Time Period:

Begin:	2005-10-05
End:	2017-09-30

Sampling, Processing and Quality Control Methods

Step by Step Procedures

Step 1:	**FCG_rating_2018.csv**
Description:	These methods were used to rate the stage discharge data pairs for Flynn Creek. There are 61 stage-discharge data pairs; 55 were considered reliable. Date: yyyy-mm-dd, date of collection Q_filtered: 1 or 2 (included); 0 (not included) Time: 00:00:00, 24-hour clock, time of day Stage1_ft: Reference stage (ft) Stage2_ft: Electronic stage (ft) Q_cfs: Discharge (ft^3/s) Stage1_m: Reference stage (m) Stage2_m: Electronic stage (m) Q_cms: Discharge (m^3/s)
Rating Curve:	**3rd order polynomial function:**
Description:	$logQ=a+b*log(H)+c*(log(H)2+d*(log(H)^3$; H, is stage (feet) and Q is discharge (cfs).
Coefficients & Standard Errors (Se):	Coefficients: a (intercept), $b*H$, $c*H^2$, $d*H^3$ Fitted values: -16.9201, 37.4277, -25.7717, 6.9263 Se: 1.2916, 3.8391, 3.6641, 1.1273
Step 2:	**FCG_Stage_2006_2017.csv**
Description:	The stage and discharge time series were determined as follows for Flynn Creek: Date: yyyy-mm-ddd Time: 00:00:00 AM or PM Stage_ft: stage (ft) Stage_m: stage (m)
Stage Correction:	Period: 2006-2010, 2011-2017 and stage < 2.3 feet, 2011-2017 and stage > 2.3 feet Correction: $Stage_C=(Stage_\mu-b)/m$, m=0.994 b=0.034, $Stage_C=(Stage_\mu-b)/m$, m=0.9934 b=0.0379, $Stage_C=(Stage_\mu-b)/m$, m=0.9675 b=0.1481
Description:	$Stage_C$ is corrected stage, $Stage_\mu$ is the uncorrected stage and m and b are the slope and intercept of the relation between reference stage and electronic stage.

Step 3:	**FCG_Stage_gauge-logger-pairs_2012_2017.csv & FCG_Stage_gauge-logger-pairs_2008_2010.csv**
Description:	These methods for Flynn Creek determined the correction for the stage based on the comparison between the reference and electronic stage data: Date: yyyy-mm-dd, Date of collection Ref_stage_ft: Reference stage (ft) Station_stage_ft: Electronic Stage (ft) Dif_ft: Difference: Electronic Stage- Reference stage (ft) WY: Water year Shovel: 1: post sediment removal; 2: pre sediment removal; 3: instances when sediment was not removed. Ref_stage_m: Reference stage (m) Station_stage_m: Electronic Stage (m) Dif_m: Difference: Electronic Stage- Reference stage (m)
Step 4:	**FCG_10_Q_minute_data_2006-2017.csv**
Description:	The stage and discharge time series were determined as follows for Flynn Creek: Date: yyyy-mm-dd Time: 00:00:00, 24- hour clock Stage_ft: Raw uncorrected stage (ft) Stage10correc1_ft: Corrected stage (ft) Q_10_raw_cfs: Discharge calculated based on raw stage and rating curve (ft^3/s) Q_10_corr1_cfs: Discharge calculated based on corrected stage and rating curve (ft^3/s) Stage_m: Raw uncorrected stage (m) Stage10correc1_m: Corrected stage(m) Q_10_raw_cms: Discharge calculated based on raw stage and rating curve (m^3/s) Q_10_corr1_cms: Discharge calculated based on corrected stage and rating curve (m^3/s)
Step 5:	**FCG_daily_Q_data_2006_2017.csv**
Description:	The stage and discharge time series were determined as follows for Flynn Creek: Date: yyyy-mm-dd Stage_raw_ft: Raw uncorrected stage (ft) Stagecorrec1_ft: Corrected stage (ft) Qraw_cfs: Discharge calculated based on raw stage and rating curve (ft^3/s) Qcorr1_cfs: Discharge calculated based on corrected stage and rating curve (ft^3/s) Stage_raw_m: Raw uncorrected stage (m) Stagecorrec1_m: Corrected stage (m) Qraw_cms: Discharge calculated based on raw stage and rating curve (m^3/s) Qcorr1_cms: Discharge calculated based on corrected stage and rating curve (m^3/s)
Step 6:	**NBG_rating_2018.csv**
Description:	These methods were used to rate the stage-discharge data pairs. There are 59 stage-discharge data pairs; 49 were considered reliable. Date: yyyy-mm-dd, date of collection Q_filtered: 1 (included); 0 (not included) Time: 00:00:00, 24-hour clock, time of day Stage1_ft: Reference stage (ft) Stage2_ft: Electronic stage (ft) Q_cfs: Discharge (ft^3/s) Stage1_m: Reference stage (m) Stage2_m: Electronic stage (m) Q_cms: Discharge (m^3/s) **2nd order polynomial function:** $logQ=a+b*log(H)+c*(log(H))^2$ where H, is stage in feet and Q is discharge in cfs
Rating Curve:	Coefficient: a (intercept), b*H, c*H^2
Coefficients & Standard Errors (Se):	Value: -3.57, 9.5247, -2.8025 Se: 0.088, 0.3201, 0.254

Step 7:	**NBG_Stage_gauge_logger_pairs_2008_2010.csv & NBG_Stage_gauge-logger-pairs_2012_2017.cvs**
Description:	These methods for Needle Branch determined the correction for the stage based on the comparison between the reference and electronic stage data. Date: yyyy-mm-dd, Date of collection Ref_stage_ft: Reference stage (ft) Station_stage_ft: Electronic Stage (ft) Dif_ft: Difference: Electronic Stage- Reference stage (ft) WY: Water year Shovel: 1: post sediment removal; 2: pre sediment removal; 3: instances when sediment was not removed. Ref_stage_m: Reference stage (m) Station_stage_m: Electronic Stage (m) Dif_m: Difference: Electronic Stage- Reference stage (m)
Stage Correction:	**Period: 2006- 2017** Correction:$Stage_C$=($Stage_\mu$-b)/m, m=0.9845 b=0.0549
Description:	$Stage_C$ is corrected stage, $Stage_U$ is the uncorrected stage and m and b are the slope and intercept of the relation between reference stage and electronic stage.
Step 8:	**NBG_Stage_2006_2017.csv**
Description:	Date: yyyy-mm-dd Time: 00:00:00 AM or PM Stage_ft: stage (ft) Stage_m: stage (m)
Step 9:	**NBG_10_Q_minute_data_2006-2017.csv**
Description:	Date: yyyy-mm-dd Time: 00:00:00, 24- hour clock Stage_ft: Raw uncorrected stage (ft) Stage10correc1_ft: Corrected stage (ft) Q_10_raw_cfs: Discharge calculated based on raw stage and rating curve (ft^3/s) Q_10_corr1_cfs: Discharge calculated based on corrected stage and rating curve (ft^3/s) Stage_m: Raw uncorrected stage (m) Stage10correc1_m: Corrected stage(m) Q_10_raw_cms: Discharge calculated based on raw stage and rating curve (m^3/s) Q_10_corr1_cms: Discharge calculated based on corrected stage and rating curve (m^3/s)
Step 10:	**NBG_daily_Q_data_2006-2017.csv**
Description:	Date: yyyy-mm-dd Stage_raw_ft: Raw uncorrected stage (ft) Stagecorrec1_ft: Corrected stage (ft) Qraw_cfs: Discharge calculated based on raw stage and rating curve (ft^3/s) Qcorr1_cfs: Discharge calculated based on corrected stage and rating curve (ft^3/s) Stage_raw_m: Raw uncorrected stage (m) Stagecorrec1_m: Corrected stage (m) Qraw_cms: Discharge calculated based on raw stage and rating curve (m^3/s) Qcorr1_cms: Discharge calculated based on corrected stage and rating curve (m^3/s)

Step 8:	**DCG_rating_2018.csv**
Description:	These methods were used to rate the stage-discharge data pairs. There are 50 stage-discharge data pairs; 48 were considered reliable. Date: yyyy-mm-dd, Date of collection Q_filtered: 1 (included); 0 (not included) Stage1_ft: Reference stage (ft) Stage2_ft: Electronic stage (ft) Q_cfs: Discharge (ft^3/s) Stage1_m: Reference stage (m) Stage2_m: Electronic stage (m) Q_cms: Discharge (m^3/s)
Rating Curve:	**Power function** $Q=-0.44H^{3.98}$
Description:	H, is stage in feet and Q is discharge in cfs
Coefficients & Standard Errors (Se):	Coefficients: a (intercept), b Value: -0.44775, 3.9796 Se: 0.048703, 0.056933
Step 9: Description:	**DCG_Stage_gauge-logger-pairs_2008_2010.csv & DCG_Stage_gauge-logger-pairs_2012_2017.csv** These methods for Deer Creek determined the correction for the stage based on the comparison between the reference and electronic stage data. Date: yyyy-mm-dd, Date of collection Ref_stage_ft: Reference stage (ft) Station_stage_ft: Electronic Stage (ft) Dif_ft: Difference: Electronic Stage- Reference stage (ft) WY: Water year Shovel: 1: post sediment removal; 2: pre sediment removal; 3: instances when sediment was not removed. Ref_stage_m: Reference stage (m) Station_stage_m: Electronic Stage (m) Dif_m: Difference: Electronic Stage- Reference stage (m)
Stage Correction:	**Period: 2016-2017**
Description:	Correction: $Stage_C=(Stage_\mu-b)/m$, m=0.9829,b=0.0346; $Stage_C$ is corrected stage, $Stage_U$ is the uncorrected stage and m and b are the slope and intercept of the relation between reference stage and electronic stage, respectively.
Step 10:	**DCG_stage_2006_2017.csv**
Description:	The stage and discharge time series were determined as follows for Deer Creek: Date: yyyy-mm-dd Time: 00:00:00 AM or PM Stage_ft: Stage (ft) Stage_m: Stage (m)
Step 11:	**DCG_10_Q_minute_data_2006-2017.csv**
Description:	Date : yyyy-mm-dd Time : 00:00:00 Stage_ft: raw stage (ft) Stage10correc1_ft: Stage corrected (ft) Q_10_raw_cfs: Discharge calculated based on raw stage and rating curve (ft^3/s) Q_10_corr1_cfs :f Discharge calculated based corrected stage and rating curve (ft^3/s) Stage_m: raw stage (m) Stage10correc1_m: Stage corrected (m) Q_10_raw_cms: Discharge calculated based on raw stage and rating (m^3/s) Q_10_corr1_cms: Discharge calculated based corrected stage and rating curve (m^3/s)

Step 11:	**DCG_daily_Q_data_2006-2017.txt**
Description:	The stage and discharge time series were determined as follows for Deer Creek: Date : yyyy-mm-dd Stageraw_ft : Raw uncorrected stage (ft) Stagecorrec1_ft : Stage corrected (ft) Qraw_cfs : Discharge calculated based on raw stage and rating curve (ft^3/s) Qcorr1_cfs : Discharge calculated based corrected stage and rating curve(ft^3/s) Stageraw_m : Raw uncorrected stage (m) Stagecorrec1_m : Stage corrected (m) Qraw_cms : Discharge calculated based on raw stage and rating curve (m^3/s) Qcorr1_cms : Discharge calculated based corrected stage and rating curve (m^3/s)
Sampling Area And Frequency:	In this contemporary period, 2006 to 2017 (12 water years), data were collected at 10-minute intervals, including three to eight years of pre-harvest data rating curves were developed. Based 40 to 55 stage-discharge data points collected for each watershed. Hydrologic units for these areas are as follows: Alsea River, HUC8: 17100205 Drift Creek, HUC10: 1710020503 Middle Drift Creek, HUC12: 171002050302 Flynn Creek, HUC14: 17100205030201 Deer Creek, HUC14: 17100205030201 Needle Branch, Creek HUC 14: 17100205030202
Sampling Description:	Effects of forest harvest were calculated following methods in: Jones, J. A., & Post, D. A. (2004). Seasonal and successional streamflow response to forest cutting and regrowth in the northwest and eastern United States. Water Resources Research, 40(5), 1–19. https://doi.org/10.1029/2003WR002952
Sampling Description:	Perry, T. D., & Jones, J. A.(2017). Summer streamflow deficits from regenerating Douglas-fir forest in the Pacific Northwest, USA. Ecohydrology, 10(2), 1–13. https://doi.org/10.1002/eco.1790 Special Collections and Archives. (2020) Alsea Watershed Study 1959-1972 [Data Set] Oregon State University. https://doi.org/10.7267/c821gr90d Souder, J. (2020). Alsea Watershed Study 1959-1972 (Version 1) [Dataset]. Oregon State University. https://doi.org/10.7267/c821gr90d

Data Set Usage Rights

Access Control:

Auth System:	knb	
Order:	allowFirst	
Allow:	[read]	public