Memorandum

To: *SCDNR*

From: *CDM Smith*

Date: *June 23, 2020;* ***Updated November 3, 2020 (updates are in blue)***

Subject: *2020 Edisto SWAM Model Updates*

1.0 Introduction and Overview

The Edisto River Basin baseline water allocation model was updated to incorporate newly available water use and return data, to extend the baseline hydrologic period, and to improve the spatial resolution of the model. Model updates included recalculating baseline 10-year average water demands (2009 – 2018) for all water users, adding new water users, removing water users with inactive permits, adding new explicit tributary objects, and extending the baseline simulation period from January 2016 through December 2018. Extending the baseline simulation period required using recent USGS streamflow gage data, combined with water use and return data and area transposition methods, to "un-impair" flow records and generate un-impaired model headwater boundary condition flows. Updated downstream flow records were then used to validate model hydrologic parameterization. Additionally, recent flow records from a new USGS flow gage (02172558, EDO14) were used to improve model parameterization in the upper South Fork Edisto River. An updated model calibration resulted.

The result of this work is an improved model with more accurate representation of water demands in the basin and a larger range of hydrologic variability captured by the simulation period. Confidence is higher in the upper South Fork Edisto River modeled flows as a result of the model recalibration and the addition of a calibration target in the upper South Fork Edisto River. Additionally, previously calibrated hydrologic parameters throughout the basin were validated with comparisons of modeled and gaged flows for the simulation extension period.

2.0 Model Object Changes

Multiple new tributary objects and water user were added to the model as part of this update. New tributaries were added to the model to improve spatial resolution in specific sub-catchments and to allow for a more accurate and explicit representation of source streams for many of the new water users. The new tributaries do not represent new source waters in the model. Rather, they are a more explicit representation in the model, compared to a more implicit, lumped representation within larger tributary objects in the previous version of the model. As such, in coordination with the addition of these new tributary objects, drainage areas associated with existing, previously

lumped, tributary objects were reduced accordingly. The total basin drainage area captured by the model is unchanged.

Table 1 (all tables and figures are included in **Attachment A**) lists the explicit tributaries and the gages and reference gages used for computing headwater flows. Newly added explicit tributaries and their drainage areas are shown in **Figure 1**. **Table 2** lists the implicit tributaries and their reference gages used for confluence flows. **Table 3** lists all tributary objects, their confluence location, drainage area, headwater area, drainage area ratio and subbasin flow factors. **Table 4** lists the mainstem (South Fork Edisto River) gain/loss factors.

As noted in previous modeling reports, best attempts were made to explicitly include all river tributaries with significant surface water withdrawals in the original developed models. In a limited number of cases, small withdrawals (primarily agricultural) are registered from small streams but are represented in the models as withdrawing from a downstream receiving stream or river, or have been aggregated with other nearby registered withdrawals. This occurs in the models because the actual source stream is not explicitly included as a tributary object. There are multiple reasons for this. Firstly, there are practical constraints to the models' resolution. Accuracy in predicting small, ungaged, stream flow rates is low. Adding spatial resolution to the river network adds complexity without necessarily adding any real predictive value. Further, providing this level of detail to the model user can be misleading with respect to the model's capabilities and appropriate applications. The primary disadvantage of not explicitly including a source stream is that the physical availability calculation in the model will over-represent available volume for the water user(s) specific to that stream. However, as noted above, our ability to disaggregate these flows into smaller tributaries with any confidence is limited. Either way, there is no significant impact on downstream receiving water flow calculations in the model. In our original model development, we therefore attempted to balance these considerations with the utility of added spatial resolution.

In the Edisto model, there are several instances in the headwaters area where agricultural withdrawals in proximity are aggregated (e.g., Titan Farms Beech, Bog, Temple and South Fork agricultural irrigation objects. These typically occur on small, third or higher order streams and many of the withdrawal points are located on small impoundments or ponds. Since it is difficult to accurately predicting small, ungaged, stream flow rates, and because many of the withdrawals are located on small impoundments that provide storage which is not represented in the model, aggregation of these withdrawal points is warranted.

New water users represent those that are newly registered or have just recently surpassed the minimum water use threshold for inclusion in the model of 3 million gallons per month (MGM). Water demands associated with the new users were quantified based on the South Carolina Department of Health and Environmental Control (DHEC) reported water use and discharge databases. **Table 5** lists the surface water user objects included in the model and their sources of supply. Water demands are specified in the baseline model as monthly mean values for all water user objects. Two new surface water registrations, Lois Ann Farm (38IR156S01) and Guinyard's Landing (38IR164S01), have been added as agriculture water user objects; however, no withdrawals have been reported.

3.0 Baseline Period Extension

The baseline simulation period was extended by two years, from 1931 – 2016 to 1931 – 2018. The Edisto model had previously been extended through 2016 as part of a model update completed by SCDNR in 2017 (SCDNR, 2017a and SCDNR, 2017b). To achieve this latest extension, model boundary condition (headwater) flows were developed for the additional two years, on both a monthly and daily timestep. As done for the original model development, un-impaired gaged flow data were used to estimate flows at ungaged model input locations. The un-impairment process exactly followed the process detailed elsewhere (CDM Smith, 2016) whereby un-impaired flows were calculated by adding in all known upstream consumptive water withdrawals and subtracting out upstream discharges from a downstream gaged flow record. This process was applied to the following gages in the Edisto basin: EDO05, EDO06, EDO07, and EDO12. Additionally, statistical methods (MOVE.1 with log transform) were used to extend the unimpaired flow records of the following inactive gages: EDO03, EDO04, EDO09, EDO11. The statistical methods employed, and the assignment of reference gages, are described elsewhere (CDM Smith, 2016).

The eight gages serve as key reference points for ungaged flow estimates at model input points. Area transposition methods, based on ratios of drainage areas, were used to estimate monthly and daily flows for the period extension, for key model headwater input locations. Again, the assignment of reference gages for this exercise matched that employed during the original model development. As described above, new model tributaries were assigned reference gages based on those used for other tributaries within their larger sub-catchment. The extended headwater flows were added to all model tributary objects. Flows prior to 2017 were unchanged in the model, except those associated with new tributary objects.

In addition to extending model flow inputs, water demand estimates were updated to more accurately reflect current conditions. New baseline water demand, discharge and consumptive use estimates for the 10-year period 2009 through 2018, were developed using the DHEC reported water use and discharge data. These calculations were consistent with methodologies employed for the original baseline model development (CDM Smith, 2017). Updated mean monthly water demands and discharge parameters were entered into the model for all water user objects. The updated baseline water demands are provided in **Table 6** for industrial (IN), power/thermal (PT) and water supply (WS) users and in **Table 7** for agriculture (IR) and golf course (GC) users. Model return (discharge) locations are listed in **Table 8**. Updated consumptive use percentages are provided in **Table 9** and updated return flows for discharge objects are provided in **Table 10**.

4.0 Model Recalibration and Validation

In 2014, a new USGS flow gage in the basin was activated: 02172558, South Fork Edisto River above Springfield (labeled EDO14 for modeling purposes). This gage is in the upper South Fork region, an area noted as previously lacking in data and associated with relatively high model uncertainty. The availability of a reasonable period of recorded data at this key location prompted a recalibration of model hydrologic parameters specific to this part of the basin. This effort was undertaken to refine the spatial resolution of calibrated model parameters and to improve confidence in model output in the upper South Fork. With EDO14 serving as an additional calibration target, the model was

recalibrated following the same procedure, and using the same hydrologic performance metrics, as in the original model calibration.

The sole calibration parameters for this exercise were the mainstem (South Fork) reach gain/loss coefficients for sub-reaches in the upper basin. As previously quantified, these parameters vary both spatially and temporally, according to user-defined sub-reaches and flow percentile bins, respectively. To achieve a satisfactory calibration at EDO14, the gain/loss coefficients for the first sub-reach (mile marker 0 to mile marker 40) were adjusted from previously established values. The EDO14 model flow gage object is located at mile marker 40.5. Subsequent to these initial adjustments, downstream sub-reach flow factors were also modified to reestablish a satisfactory calibration at downstream flow gage locations (EDO05, EDO06, EDO07, EDO011, and EDO13). Changes to upstream flow gains necessitated the adjustments to the downstream parameters. Additionally, an existing mainstem sub-reach was further subdivided, and parameterized, to provide improved model spatial resolution in the vicinity of EDO06.

The modifications described above were motivated by the availability of new gaged flow data at EDO14. The addition of this new calibration target, and associated parameter adjustments, have resulted in an improved model with higher levels of predictive confidence, particularly in the upper South Fork catchment. It should be noted that, independent of the re-calibration exercise, existing model hydrologic parameters throughout the basin were validated using data associated with the extended simulation period. Comparison of modeled and gaged flow for the extension period (2017 – 2018) returned satisfactory results for all basin gages, thereby validating previous calibration work. The baseline model was used for this validation exercise.

Model calibration results for both the monthly and daily timesteps are summarized **Attachment B**. For all existing calibration targets, results are generally as good as, or better than, those from the original model calibration. Model validation results, which focus on the recent, extended simulation period and were generated using the updated baseline model, are provided in **Attachment C**.

5.0 References

CDM Smith, 2016. Technical Memorandum - Unimpaired Flow Dataset for the Edisto River Basin (Revised May 2016).

CDM Smith, 2017. South Carolina Surface Water Quantity Models - Edisto Basin Model.

SCDNR, 2017a. Technical Memorandum E2 - Updating the SWAM Edisto Unimpaired Flows.

SCDNR, 2017b. Technical Memorandum E3 - 2014-2016 Extension of water use data for Edisto SWAM Calibration Model.

2020 Edisto SWAM Model Updates

Attachment A

Tables and Figures

Table 1. Gages and Reference Gages Used for Headwater Flows on Explicit Tributaries

	Headwater Input			USGS Reference Gage (Unimpaired)		
Project ID	**Type**	**USGS Number**	**SWAM Tributary**	**Project Gage ID**	**USGS Number**	**Stream**
New Explicit Trbutaries Added						
EDO5001	Ungaged	-	Yarrow Branch	EDO05	2173000	South Fork Edisto River
EDO5002	Ungaged	-	Tinkers Creek			
EDO5003	Ungaged	-	Tampa Creek			
EDO5006	Ungaged	-	Hillyer Branch			
EDO5007	Ungaged	-	Beaverdam Branch			
EDO5008	Ungaged	-	Rocky Swamp Creek			
EDO5004	Ungaged	-	Burke Creek	EDO10	2173500	North Fork Edisto River
EDO5005	Ungaged	-	Saddler Swamp			
All Other Explicit Trbutaries						
EDO220	Ungaged	-	Dean Swamp Creek	EDO04	02172640	Dean Swamp Creek
EDO202	Ungaged	-	Temples Creek	EDO05	2173000	South Fork Edisto River
EDO208	Ungaged	-	S. Fork Edisto River (Mainstem)			
EDO204	Ungaged	-	Beech Creek			
EDO206	Ungaged	-	Bog Branch			
EDO210	Ungaged	-	Mill Creek			
EDO218	Ungaged	-	Sykes Swamp			
EDO224	Ungaged	-	Goodland Creek			
EDO228	Ungaged	-	Windy Hill Creek			
EDO232	Ungaged	-	Little River[1]			
EDO214	Ungaged	-	Shaw Creek			
EDO236	Ungaged	-	Hayes Mill Creek	EDO06	02173030	South Fork Edisto River
EDO240	Ungaged	-	Roberts Swamp	EDO07	02173051	South Fork Edisto River
EDO256	Ungaged	-	Bull Swamp Creek	EDO09	02173351	Bull Swamp Creek
EDO226	Ungaged	-	N. Fork Edisto River (with Chinquapin Creek)	EDO10	2173500	North Fork Edisto River
EDO242	Ungaged	-	Duncan Creek			
EDO246	Ungaged	-	Long Branch			
EDO248	Ungaged	-	Black Creek			
EDO260	Ungaged	-	Limestone Creek			
EDO266	Ungaged	-	Caw Caw Swamp			
EDO278	Ungaged	-	Cooper Swamp	EDO11	02174000	Edisto River
EDO280	Ungaged	-	Four Hole Swamp	EDO12	02174250	Cow Castle Creek
EDO282	Ungaged	-	Goodbys Swamp			
EDO284	Ungaged	-	Cow Castle Creek			
EDO288	Ungaged	-	Providence Swamp			
EDO296	Ungaged	-	Polk Swamp			
EDO298	Ungaged	-	Indian Field Swamp			
EDO01	Gaged	02172300	McTier Creek	-	-	-
EDO08	Gaged	02173212	Cedar Creek	-	-	-

Notes:

[1] Little Creek was called Willow Swamp in previous model versions

Table 2. Reference Gages Used for Confluence Flows on Implicit Tributaries

	Ungaged Basin	USGS Reference Gage (Unimpaired)		
Project ID	**SWAM Tributary**	**Project Gage ID**	**USGS Number**	**Stream**
EDO400	Rocky Springs Creek	EDO03	02172500	South Fork Edisto River
EDO401	Cedar Creek (Implicit)	EDO05	02173000	South Fork Edisto River
EDO402	Hunter Branch			
EDO403	Pond Branch			
EDO405	Spur Branch			
EDO407	Snake Swamp			
EDO408	Betty Branch			
EDO410	Pen Branch			
EDO409	Cattle Creek	EDO12	02174250	Cow Castle Creek

Table 3. Model Tributary Inputs

SWAM Tributary Object	Tributary Type	Confluence Stream	Confluence Location (mile)	Area (ac)	Headwater ID	End Mile	Drainage Area Ratio	Subbasin Flow Factor (unitless)
Beech Creek	Explicit	Mainstem	6.5	3,808	EDO204	3.9	39.7	39.7
				5,152		6.2	53.7	53.7
Beaverdam Branch	Explicit	Shaw Creek	8.51	3,788	EDO5007	4.8	51.9	51.9
Black Creek	Explicit	North Fork Edisto River	27.4	22,279	EDO248	3.8	2.8	2.8
				37,033		9.2	4.6	4.6
				43,746		14.9	5.4	5.4
Bog Branch	Explicit	Beech Creek	4	1,865	EDO206	1.6	6.0	6.0
				2,229		2.7	7.2	7.2
				3,188		3.7	10.3	10.3
Bull Swamp Creek	Explicit	North Fork Edisto River	52.3	21,685	EDO256	4.9	4.2	4.2
				55,704		12.3	10.8	10.8
				61,543		17.4	12.0	12.0
Burke Creek	Explicit	Caw Caw Swamp	1.25	7,051	EDO5004	6.4	172.0	172.0
Caw Caw Swamp	Explicit	North Fork Edisto River	68.3	177,781	EDO266	4.1	4.4	4.8
				225,930		7.5	5.7	6.1
				244,448		10.6	6.2	6.1
Cedar Creek	Explicit	North Fork Edisto River	29.9	27,372	EDO08	1	1.0	1.0
Cooper Swamp	Explicit	North Fork Edisto River	89.3	9,131	EDO278	6	4.9	4.9
				17,029		10.3	9.1	9.1
Cow Castle Creek	Explicit	Four Hole Swamp	14.9	15,472	EDO284	9.6	6.7	6.6
				43,706		19.5	19.0	19.0
Dean Swamp Creek	Explicit	Mainstem	50	19,894	EDO220	3.6	1.4	1.4
				41,752		13.2	3.0	3.0
Duncan Creek	Explicit	North Fork Edisto River	2.7	3,256	EDO242	1.9	4.5	4.5
				4,179		3.4	5.8	5.8
Hillyer Branch	Explicit	Shaw Creek	6.5	1,701	EDO5006	2.7	74.0	74.0
Mainstem (South Fork Edisto River)	Explicit	None	None	1,715,508	EDO208	*See Table 4 for Gain/Loss factors*		
Four Hole Swamp	Explicit	Mainstem	157	112,968	EDO280	15	2.2	2.2
				178,520		30.4	3.5	3.5
				314,308		52.4	6.2	5.5
Goodbys Swamp	Explicit	Four Hole Swamp	6.7	8,004	EDO282	2	2.4	2.4
				9,519		4.6	2.8	2.8
Goodland Creek	Explicit	Mainstem	59.7	24,123	EDO224	2.1	1.1	1.1
				28,412		6.1	1.4	1.4
Hayes Mill Creek	Explicit	Mainstem	72.6	7,627	EDO236	1.1	1.1	1.1
Indian Field Swamp	Explicit	Polk Swamp	10	48,786	EDO298	5.4	1.6	1.6
				59,696		9.6	1.9	1.9
Lightwood Knot Creek	Explicit	North Fork Edisto River	10.7	18,675	EDO246	2.6	1.6	1.6
				23,233		5.6	2.0	2.0
Limestone Creek	Explicit	North Fork Edisto River	62	10,587	EDO260	1	2.0	2.0
				12,184		2.5	2.3	2.3
				12,602		3.5	2.4	2.4
				12,979		4.8	2.4	2.4
Little River[1]	Explicit	Mainstem	67	13,812	EDO232	3	1.4	1.4
McTier Creek	Explicit	Mainstem	17.5	9,963	EDO01	0.1	1.0	1.0
				22,318		3.4	2.2	2.0
				24,632		5.5	2.5	2.3
Mill Creek	Explicit	Mainstem	8.4	6,386	EDO210	2	31.3	31.3
				9,467		4.6	46.5	46.5
North Fork Edisto River	Explicit	Mainstem	100.3	82,729	EDO226	27.5	685	685
				169,659		52.4	1405	1405
				213,997		71	1772	2240
				247,676		99.6	2051	2240

[1] Little River was previously called Willow Swamp in the model.

Table 3. Model Tributary Inputs (continued)

SWAM Tributary Object	Tributary Type	Confluence Stream	Confluence Location (mile)	Area (ac)	Headwater ID	End Mile	Drainage Area Ratio	Subbasin Flow Factor (unitless)
Polk Swamp	Explicit	Mainstem	146.6	30,692	EDO296	4.2	1.8	1.8
				40,334		11.7	2.3	2.3
Providence Swamp	Explicit	Four Hole Swamp	17.6	17,726	EDO288	2.5	1.7	1.7
				39,712		6.8	3.7	3.7
Rocky Swamp Creek	Explicit	Mainstem	59.8	16,463	EDO5008	5.3	1.9	1.9
Roberts Swamp	Explicit	Mainstem	80.3	22,018	EDO240	1.7	1.1	4.5
Saddler Swamp	Explicit	Caw Caw Swamp	3.85	7,477	EDO5005	6	89.0	89.0
Shaw Creek	Explicit	Mainstem	32.3	21,360	EDO214	8.5	163	219
				43,744		19.7	394	450
				85,370		34.5	822	760
Sykes Swamp	Explicit	Mainstem	69.2	2,281	EDO218	1.7	3.9	3.9
				5,705		4.4	9.8	9.8
Tampa Creek	Explicit	Goodland Creek	1	9,932	EDO5003	7	71.5	71.5
Temples Creek	Explicit	Mainstem	2.4	1,894	EDO202	0.7	1.7	1.7
				2,492		1.4	2.3	2.3
				3,533		2.3	3.2	3.2
Tinker Creek	Explicit	Windy Hill Creek	2.58	656	EDO5002	1.26	17.7	17.7
Windy Hill Creek	Explicit	Mainstem	61	6,152	EDO228	3	2.6	2.6
				12,388		7	5.3	5.3
Yarrow Branch	Explicit	Mainstem	46	10,811	EDO5001	7.6	57.5	57.5
Betty Branch	Implicit	Mainstem	103.6	20,789	EDO408	1	1.0	1.0
Cattle Creek	Implicit	Mainstem	125.1	33,511	EDO409	1	1.0	1.0
Cedar Creek	Implicit	Mainstem	31	27,372	EDO401	1	1.0	1.0
Hunter Branch	Implicit	Mainstem	40.5	8,779	EDO402	1	1.0	1.0
Pen Branch	Implicit	Mainstem	107.3	10,489	EDO410	1	1.0	1.0
Pond Branch	Implicit	Mainstem	43	22,085	EDO403	1	1.0	1.0
Rocky Springs Creek	Implicit	Mainstem	22.9	17,277	EDO400	1	1.0	1.0
Snake Swamp	Implicit	Mainstem	82.4	10,802	EDO407	1	1.0	1.0
Spur Branch	Implicit	Mainstem	53.3	13,577	EDO405	1	1.0	1.0

Table 4. Mainstem Gain/Loss Factors

Flow Percentiles	Mainstem (South Fork Edisto River) End Miles					
	40.2	69.3	77	82	114.2	218.1
0.01	6.00	-0.50	0.00	-5.00	-2.00	-12.00
0.10	6.00	0.50	0.00	-3.00	-2.00	-12.00
0.20	5.50	1.50	0.00	-1.00	-3.00	-8.00
0.30	4.50	2.00	0.00	4.50	-3.00	-7.00
0.40	5.50	2.50	0.00	8.00	-3.00	-7.00
0.50	5.50	4.50	0.00	30.00	-5.00	-7.00
0.60	3.50	5.00	5.00	45.00	-5.00	3.00
0.70	3.50	5.50	5.00	45.00	10.00	3.00
0.80	2.50	7.00	10.00	55.00	12.00	5.00
0.85	2.50	7.00	15.00	55.00	12.00	5.00
0.95	3.00	7.00	20.00	55.00	12.00	16.00
1.00	3.00	7.00	25.00	60.00	12.00	18.00

Table 5. Surface Water User Objects and Sources of Supply Included in the Edisto River Basin Model

Model Object ID	Facility Name	Source of Supply	Intake ID	Diversion Location (mi)	Permit Limit or Registration (MGM)
GC: Indian Trail	INDIAN TRAIL GOLF CLUB	Duncan Creek	32GC011S01	3.0	3
GC: Orangeburg CC	ORANGEBURG COUNTRY CLUB	North Fork Edisto River	38GC004S01	66.0	11
IN: SI Group	SI GROUP (FORMERLY ALBEMARLE)	North Fork Edisto River	38IN002S01	72	2,743.3
IR: Backman	BACKMAN FARMS	Little River	38IR020S01	2.8	60.5
IR: Bear Spring Farm, Inc.	BEAR SPRING FARM	North Fork Edisto	38IR139S01	58.2	4.3
IR: Boland	BOLAND FARM	Dean Swamp Creek	38IR081S01	11.5	8.5
			38IR081S02		6.0
IR: Brown	BROWN FARMS	Little River	38IR015S01	2.0	4.2
		South Fork Edisto River	38IR015S02	69.0	13.0
IR: Bull Swamp	BULL SWAMP PLANTATION	Bull Swamp Creek	38IR014S01	13.0	12.0
			38IR014S02		14.9
			38IR014S03		16.0
IR: Cotton Lane	COTTON LANE FARMS	Goodby's Swamp	09IR003S01	2.4	19.5
			09IR003S02		30.1
			09IR003S04		6.5
IR: Double B Farms	DOUBLE B FARMS	Mainstem	05IR057S01	75.2	33.7
IR: Gray	GRAY FARM	Cooper Swamp	38IR042S01	1.5	7.0
IR: Gregg Bates	GREG BATES FARM	Yarrow Branch	06IR037S01	1.0	7.6
			06IR037S02		4.6
IR: Guinyard's	GUINYARD'S LANDING, INC.	South Fork Edisto River	38IR164S01	45.9	559.5
IR: Edward Rast	EDWARD RAST FARM - LIVINGSTON	Bull Swamp Creek	38IR131S01	12.0	40.7
IR: Haigler	HAIGLER FARMS INC	Four Hole Swamp	09IR009S01	9.0	55.0
			09IR009S02		28.0
			09IR009S03		36.0
			09IR009S04		28.4
IR: Holmes & Son	HOLMES & SON LEWIS FARM	Hillyer Branch	19IR002S01	1.0	16.1
			19IR002S02		32.6
IR: Inabinet Farms	INABINET FARMS	Caw Caw Swamp	09IR046S01	1.0	6.6
		Burke Creek	09IR046S02	2.3	8.0
			09IR046S03		34.0
IR: Kyzer	KYZER FARMS	Black Creek	32IR004S01	8.1	3.0
IR: Lois Ann Farm	LOIS ANN FARM	South Fork Edisto River	38IR156S01	68.9	3,200
IR: Maury Furtick	MAURY FURTICK FARM	Dean Swamp Creek	02IR028S01	9.5	6.0
IR: Miller Farm	MILLER FARM	Black Creek	32IR058S01	3.1	13.0
IR: Millwood	MILLWOOD FARM	Limestone Creek	38IR004S01	6.0	94.5
			38IR004S02	7.4	98.4
			38IR004S03		78.6
IR: Norway	NORWAY FARM	Little River	38IR067S01	2.6	30.0
IR: Oak Lane	OAK LANE FARM HALFWAY SWAMP	Sadler Swamp	09IR011S01	1.0	39.1
IR: Page Farm	PAGE FARM	Tinker Creek	06IR036S01	1.0	4.3
IR: Pebble Creek	PEBBLE CREEK ENTERPRISES	North Fork Edisto River	02IR027S01	26.0	4.0
IR: Phil Sandifer & Sons	PHIL SANDIFER & SONS, LLC	South Fork Edisto River	05IR012S01	66.0	50.0
IR: River Bluff Sod	RIVER BLUFF SOD FARM	Rocky Swamp Creek	38IR077S01	4.1	13.0
IR: Rob Bates	ROB BATES FARM	Windy Hill Creek	06IR020S01	3.0	20.0
IR: RRR Farms	RRR FARMS	Dean Swamp Creek	38IR082S01	10.5	134.0
IR: Sedso Farms	SEDSO FARMS LLC	Little River	38IR161	1.9	450.0
IR: Shady Grove	SHADY GROVE PLANTATION & NURSERY INC	Cow Castle Creek	38IR040S01	0.1	100.6
IR: Shivers Trading	SHIVERS TRADING AND OPERATING COMPANY	Sykes Swamp	05IR005S01	0.1	23.7
IR: Smith WG III	SMITH W G III	Shaw Creek	19IR012S02	1.0	16.0
			19IR012S03		12.0
			19IR012S04		3.2

Table 5. Surface Water User Objects and Sources of Supply Included in the Edisto River Basin Model (continued)

Model Object ID	Facility Name	Source of Supply	Intake ID	Diversion Location (mi)	Permit Limit (MGM)
IR: Spring Flower	SPRING FLOWER FARM	Dean Swamp Creek	02IR051S01	0.7	87.0
IR: Springfield	SPRINGFIELD FARM	Goodland Creek	38IR066S01	1.9	11.0
IR: Springfield Grain Co	SPRINGFIELD GRAIN CO BROWN KIRBY & SONS	Tampa Creek	38IR026S01	1.0	96.0
IR: Tampa Creek Farms	TAMPA CREEK FARMS	Tampa Creek	38IR075S01	1.9	60.5
IR: Thomas C. Fink	THOMAS C. FINK FARM	Black Creek	32IR050S01	1.0	40.0
IR: Thrasher Branch	THRASHER BRANCH	Dean Swamp Creek	02IR050S01	1.4	90.0
			02IR050S02	1.0	88.0
IR: Titan - Beaverdam	TITAN FARMS	Beaverdam Creek	19IR004S12	1	26.0
IR: Titan - Beech		Beech Creek	41IR014S07	5.0	30.0
			41IR014S09		25.0
			19IR004S03		20.0
			19IR004S08		20.0
IR: Titan - Bog		Bog Branch	41IR014S02	1.0	35.0
			41IR014S06		20.0
			19IR004S06		40.0
			19IR004S15		15.0
			19IR004S05	2.2	42.0
			19IR004S01	3.2	42.0
			19IR004S07		15.0
IR: Titan - Chinquapin		Chinquapin Creek	41IR010S01	1.0	71.0
IR: Titan - Mill		Mill Creek	41IR014S05	1.0	40.0
IR: Titan - Shaw		Shaw Creek	41IR014S10	6.0	36.0
IR: Titan - South Fork		South Fork Edisto River	19IR004S09	6.0	25.0
			19IR004S13		42.0
			19IR004S14		42.0
			02IR024S02		25.0
IR: Titan - Temples		Temples Creek	19IR004S02	1.7	44.0
			19IR004S04		20.0
			19IR004S11		30.0
			19IR004S10	2.3	15.0
			19IR004S16	3.2	44.0
IR: Turf Connections	TURF CONNECTIONS	Goodland Creek	38IR078S01	1.8	15.0
IR: Walter P. Rawl & Sons	WALTER P. RAWL & SONS/WP FARL FARM	Black Creek	32IR013S08	4.9	19.3
IR: Walthers	WALTHERS FARMS	South Fork Edisto River	02IR025S01	37.0	400.0
IR: Williams & Sons	WILLIAMS & SONS FARMS	South Fork Edisto River	38IR021S01	69.1	27.1
			38IR021S02		21.7
IR: Willshire	WILLSHIRE FARMS INC	Providence Swamp	38IR043S01	3.9	9.6
			38IR043S02		8.5
PT: Dominion - Cope	DOMINION - COPE STATION	South Fork Edisto River	38PT001S01	76.9	670
WS: Aiken	CITY OF AIKEN	Shaw Creek	02WS002S01	20.0	248
WS: Batesburg-Leesville	BATESBURG WATER PLANT	Lightwood Knots Creek	32WS003S01	1.0	-
		Duncan Creek	32WS003S02	0.1	-
WS: Charleston	CHARLESTON CPW - HANAHAN WTP	Edisto River	10WS004S03	159.0	8729.36
WS: Orangeburg	CITY OF ORANGEBURG WTP	North Fork Edisto River	38WS002S03	70.0	372
			38WS002S01		1116
			38WS002S02		263.5

Table 6. Baseline Model Average Monthly Demand for IN, PT, and WS Water Users

Baseline Model Average Monthly Demand (MGD) Surface Water or Surface Water and Groundwater Users							
Month	**IN: SI Group**	**PT: Dominion - Cope**	**WS: Aiken (SW)**	**WS: Aiken (GW)**	**WS: Batesburg-Leesville**	**WS: Charleston**	**WS: Orangeburg**
Permit Limit (MGD)	**90.2**	**22.0**	**8.2**	**NA**	**NA**	**287.2**	**57.6**
Jan	0.27	4.09	0.36	5.17	1.44	33.61	6.89
Feb	0.26	3.57	0.38	5.18	1.31	35.41	6.52
Mar	0.24	3.06	0.55	5.53	1.36	34.64	6.47
Apr	0.23	2.95	1.15	6.38	1.41	40.36	6.44
May	0.23	3.42	1.73	7.09	1.53	44.03	6.74
Jun	0.28	4.64	2.13	7.53	1.66	41.49	7.74
Jul	0.27	4.81	2.18	7.50	1.65	41.86	8.17
Aug	0.27	4.67	1.87	7.55	1.65	42.06	8.09
Sep	0.25	3.67	1.63	7.42	1.53	38.21	8.16
Oct	0.23	3.08	0.97	6.82	1.39	35.71	7.51
Nov	0.21	3.37	0.47	5.87	1.26	34.85	7.15
Dec	0.21	3.33	0.32	5.03	1.35	31.55	6.47

Baseline Model Average Monthly Demand (MGD) Groundwater Users										
Month	**IN: Holcim**	**IN: Giant Cement**	**IN: Lafarge (Argos)**	**WS: Harleyville**	**WS: Blackville**	**WS: Branchville**	**WS: North**	**IN: Showa Denko**	**WS: St. George**	**WS: Wagener**
Permit Limit (MGD)	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Jan	5.84	3.05	1.96	0.07	0.30	0.15	0.15	0.19	0.63	0.09
Feb	6.63	3.22	2.28	0.07	0.30	0.15	0.14	0.19	0.75	0.09
Mar	6.40	3.37	2.13	0.07	0.28	0.14	0.13	0.17	0.73	0.08
Apr	6.16	3.09	2.40	0.08	0.29	0.15	0.13	0.18	0.69	0.08
May	5.72	3.41	2.08	0.07	0.29	0.19	0.14	0.19	0.55	0.09
Jun	5.21	3.70	2.15	0.08	0.33	0.18	0.16	0.18	0.52	0.10
Jul	5.82	3.43	2.29	0.07	0.34	0.17	0.16	0.18	0.53	0.09
Aug	5.65	3.35	2.84	0.07	0.34	0.17	0.17	0.18	0.60	0.10
Sep	5.49	3.29	1.99	0.10	0.43	0.18	0.16	0.19	0.54	0.10
Oct	6.79	2.99	2.04	0.07	0.31	0.18	0.15	0.17	0.56	0.08
Nov	5.42	2.73	1.89	0.07	0.45	0.16	0.14	0.17	0.49	0.08
Dec	5.84	2.94	1.93	0.07	0.29	0.15	0.14	0.17	0.56	0.08

Permit limits shown in MGD rather than MGM for comparative purposes. Actual permit limits are in MGM.

PT: Dominion - Cope holds a surface water permit but primarily uses groundwater.

SI Group also purchases water from Orangeburg. Only SI Group's own withdrawal is listed.

Table 7. Baseline Model Average Monthly Demand for GC and IR Water Users

Baseline Model Average Monthly Demand (MGD)											
Month	IR: Cotton Lane	IR: Backman	IR: Brown	IR: Bull Swamp	IR: Double B	IR: Edward Rast Farm	IR: Gray	IR: Gregg Bates	IR: Haigler	IR: Holmes & Son	IR: Inabinet
Registered Limit (MGD)	1.6	2.0	0.6	1.4	1.1	1.4	0.2	0.4	4.8	1.6	1.6
Jan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Feb	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Mar	0.02	0.03	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.02
Apr	0.08	0.17	0.00	0.02	0.01	0.00	0.07	0.00	0.14	0.00	0.35
May	0.15	0.64	0.00	0.10	0.12	0.00	0.15	0.02	0.40	0.02	0.50
Jun	0.30	1.23	0.00	0.29	0.16	0.12	0.44	0.08	0.48	0.07	0.67
Jul	0.42	1.00	0.00	0.30	0.38	0.12	0.44	0.06	0.46	0.08	0.83
Aug	0.43	1.03	0.00	0.29	0.31	0.35	0.32	0.06	0.12	0.09	0.80
Sep	0.20	0.75	0.003	0.10	0.07	0.12	0.03	0.05	0.03	0.00	0.36
Oct	0.02	0.15	0.008	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nov	0.01	0.00	0.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dec	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Baseline Model Average Monthly Demand (MGD)											
Month	IR: Miller	IR: Mill-wood	IR: Norway	IR: Oak Lane	IR: Page Farms	IR: Phil Sandifer & Sons	IR: Rob Bates	IR: RRR	IR: Shady Grove	IR: Shivers Trading	IR: Smith WG III
Registered Limit (MGD)	0.4	8.9	1.0	1.3	0.1	1.6	0.7	4.4	3.3	0.8	1.0
Jan	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00
Feb	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00
Mar	0.00	0.35	0.04	0.01	0.00	0.08	0.02	0.12	0.37	0.08	0.00
Apr	0.25	2.11	0.07	0.07	0.00	0.23	0.10	0.79	0.37	0.28	0.00
May	0.24	3.30	0.12	0.13	0.01	0.30	0.15	1.00	0.41	0.36	0.04
Jun	0.13	7.31	0.23	0.21	0.03	0.39	0.40	1.54	0.51	0.49	0.12
Jul	0.06	7.68	0.39	0.26	0.08	0.42	0.44	1.53	0.63	0.52	0.14
Aug	0.17	7.86	0.35	0.27	0.10	0.43	0.50	1.37	0.58	0.50	0.08
Sep	0.20	3.52	0.23	0.15	0.04	0.26	0.32	0.60	0.53	0.43	0.00
Oct	0.05	0.64	0.17	0.00	0.00	0.09	0.04	0.25	0.32	0.05	0.00
Nov	0.05	0.13	0.11	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00
Dec	0.02	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00

Table 7. Baseline Model Average Monthly Demand for GC and IR Water Users (continued)

Baseline Model Average Monthly Demand (MGD)											
Month	IR: Spring-field	IR: Spring-field Grain Co	IR: Turf Connections	IR: Tampa Creek	IR: Thomas C. Fink	IR: Titan (Beech)	IR: Titan (Bog)	IR: Titan (Chinq-uapin)	IR: Titan (Mill)	IR: Titan (Beaver-dam)	IR: Titan (Shaw)
Registered Limit (MGD)	0.4	3.2	0.5	2.0	1.3	3.1	6.9	2.3	1.3	0.9	1.2
Jan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar	0.01	0.00	0.00	0.00	0.03	0.27	0.77	0.01	0.32	0.00	0.13
Apr	0.03	0.04	0.04	0.04	0.27	0.98	1.59	0.02	0.80	0.13	0.53
May	0.11	0.21	0.06	0.06	0.46	1.64	2.57	0.85	1.16	0.58	0.90
Jun	0.17	0.31	0.10	0.09	0.70	2.04	3.71	1.74	1.33	0.87	1.20
Jul	0.23	0.37	0.09	0.08	0.70	1.95	4.31	1.70	1.29	0.65	1.03
Aug	0.14	0.27	0.09	0.05	0.71	1.72	4.18	1.16	1.29	0.39	0.52
Sep	0.09	0.10	0.09	0.01	0.50	0.95	2.74	0.33	1.13	0.00	0.20
Oct	0.06	0.00	0.05	0.00	0.03	0.00	1.14	0.09	0.58	0.00	0.00
Nov	0.01	0.00	0.01	0.00	0.00	0.00	0.33	0.07	0.00	0.00	0.00
Dec	0.00	0.00	0.01	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00

Baseline Model Average Monthly Demand (MGD)							
Month	IR: Titan (South Fork)	IR: Titan (Temples)	IR: Walter P. Rawl & Sons	IR: Walthers	IR: Williams & Sons	IR: Willshire	GC: Indian Trails
Registered Limit (MGD)	4.4	5.0	0.6	13.2	1.6	0.6	0.1
Jan	0.00	0.00	0.02	0.24	0.00	0.02	0.00
Feb	0.00	0.36	0.02	0.41	0.00	0.02	0.00
Mar	0.58	1.03	0.07	0.85	0.00	0.03	0.02
Apr	1.77	2.13	0.17	3.28	0.08	0.09	0.04
May	3.03	2.63	0.34	7.13	0.26	0.14	0.05
Jun	3.60	3.56	0.39	10.14	0.34	0.21	0.06
Jul	3.57	4.03	0.34	6.14	0.35	0.24	0.06
Aug	3.19	4.21	0.29	1.55	0.34	0.24	0.05
Sep	1.47	3.47	0.28	1.25	0.19	0.19	0.03
Oct	0.67	1.52	0.29	1.01	0.00	0.08	0.01
Nov	0.47	0.67	0.23	0.80	0.00	0.04	0.00
Dec	0.02	0.00	0.15	0.33	0.00	0.02	0.00

Note: The following agricultural (IR:) users are included in the baseline model, but have not reported surface water usage:**Bear Spring Farm, Kyzer Farms, Maury Furtick, Boland, Brown, Pebble Creek, River Bluff Sod, Louis Ann Farm, Sedso Farms, Thrasher Branch, Spring Flower Farm, and Guinyard's Landing.**

Table 8. Returns and Associated Model Objects

Model Object ID	Facility Name	NPDES Pipe ID	Associated Surface Water Permit	Associated Groundwater Withdrawal ID	Discharge Tributary	Model River Mile	% of Return Flow
Returns Represented Within Water User Objects with a Surface Water Withdrawal (and may include a Groundwater Withdrawal)							
WS: Aiken	AIKEN/SHAW CREEK WTP	SCG641003-001	02WS002	02WS002G	Shaw Creek	21	100
WS: Batesburg-Leesville	BATESBURG-LEESVILLE WWTF	SC0024465-001	32WS003S01/ 32WS003SO2	32WS002G	Duncan Creek	2.6	100
WS: Charleston	CHARLESTON CPW - HANAHAN WTP	SC0021229	10WS004S03	*none*	**Out of basin (Santee)**	160	-
		SC0024783					
		SC0040771					
		SC0046060					
		SC0038822					
WS: Orangeburg	ORANGEBURG WWTF	SC0024481-001	38WS002	*none*	North Fork Edisto River	76.4	100
IN: SI Group	SI GROUP *(FORMERLY ALBEMARLE)*	SC0001180-001	38IN002	*none*	North Fork Edisto River	73	100
PT: Dominion Cope	Dominion/COPE POWER PLANT	SC0045772-001	38PT001S01	38PT001G	Roberts Swamp	0.6	100
		SC0045772-002					
		SC0045772-003					
		SC0045772-005					
		SC0045772-006					
Returns Represented Within Water User Objects with a Groundwater Withdrawal							
IN: Holcim	HOLCIM (US) INC/HOLLY HILL PLT	SC0002992-001	*none*	38IN001G	Four Hole Swamp	26.6	100
		SC0002992-002					
		SC0002992-003					
		SC0002992-02A					
IN: Giant Cement	GIANT CEMENT COMPANY INC	SC0022667-001	*none*	18WS014G/ 18IN001G	Four Hole Swamp	25.9	100
		SC0022667-002					
		SC0022667-003					
		SC0022667-004					
		SC0022667-004					
		SC0022667-005					
IN: Lafarge (Argos)	LAFARGE BUILDING MATERIALS INC	SC0022586-001	*none*	18IN0040G	Indian Field Swamp	2.4	100
		SC0022586-002	*none*	18IN0040G	Indian Field Swamp		
WS: Harleyville	TOWN OF HARLEYVILLE	SC0038504-001	*none*	18WS003G	Indian Field Swamp		
WS: Blackville	BLACKVILLE WWTF	SC0026417-001	*none*	06WS002G	Windy Hill Creek	0.1	100
WS: Branchville	TOWN OF BRANCHVILLE	SC0047333-001	*none*	38WS007G	Edisto River	106.9	100
IN: Showa Denko	SHOWA DENKO CARBON	SC0038555-001	*none*	18IN002G	Four Hole Swamp	45.6	100
		SC0038555-01A					
WS: North	TOWN OF NORTH	SC0047821-001	*none*	38WS003G	North Fork Edisto River	43.2	100
		SC0047821-002					
WS: St. George	TOWN OF ST. GEORGE	SC0025844-001	*none*	18WS002G	Polk Swamp	0.3	100
WS: Wagener	TOWN OF WAGENER	SC0026204-001	*none*	02WS001G	Dean Swamp Creek	0.1	100
In-basin Returns Represented by Discharge Objects							
KY-TN Clay	KENTUCKY-TENN CLAY/GENTRY PIT	SC0046388-001	*none*	*none*	South Fork Edisto River	19.7	-
		SC0046388-002					
Orangeburg Fish	ORANGEBURG NTL FISH HATCHERY	SC0047023-001	*none*	*none*	North Fork Edisto River	76.2	-
		SC0047023-002					-
Returns of Withdrawals from Outside the Basin Represented by Discharge Objects							
ECWSA Import	EDGEFIELD COUNTY WATER & SEWER AUTHORITY	SC0025691-001	19WS001	*none*	South Fork Edisto River	0.3	100
Bowman Import	LAKE MARION REGIONAL WATER SYSTEM	SC0040037-001	38WS052	*none*	Cow Castle Creek	11.6	100

Note: Returns outside of the Edisto River Basin are indicated in **bold**.

Table 9. Baseline Model Monthly Consumptive Use Percentage

Monthly Consumptive Use (%)								
Month	**IN: SI Group**	**PT: Dominion - Cope**	**WS: Aiken[1]**	**WS: Batesburg-Leesville**	**WS: Charleston[2]**	**WS: Orangeburg**	**IN: Holcim**	**IN: Giant Cement**
Jan	0.79	63.78	99.19	15.32	56.30	32.60	0.00	0.00
Feb	0.79	56.02	99.19	8.39	53.15	23.73	0.00	0.00
Mar	0.73	50.88	99.19	4.19	52.67	20.36	0.00	0.00
Apr	0.72	47.96	99.19	16.25	56.58	26.42	0.00	0.00
May	0.71	58.01	99.19	24.54	62.95	37.81	0.00	0.00
Jun	0.73	57.97	99.19	35.21	53.55	45.46	0.00	0.00
Jul	0.81	59.94	99.19	40.42	56.55	51.95	0.00	0.00
Aug	0.78	57.06	99.19	42.08	56.09	52.26	0.00	0.00
Sep	0.71	40.99	99.19	39.92	57.24	54.03	0.00	0.00
Oct	0.69	46.67	99.19	31.72	60.72	46.17	0.00	0.00
Nov	0.59	58.37	99.19	27.19	62.78	44.58	0.00	0.00
Dec	0.74	47.91	99.19	13.71	52.66	30.78	0.00	0.00

Monthly Consumptive Use (%)								
Month	**IN: Lafarge (Argos)**	**WS: Harleyville**	**WS: Blackville**	**WS: Branchville**	**WS: North**	**IN: Showa Denko**	**WS: St. George**	**WS: Wagener**
Jan	0.00	9.52	31.12	42.01	66.32	18.19	0.00	23.33
Feb	0.00	8.62	28.04	29.34	60.24	23.81	0.00	26.50
Mar	0.00	10.14	20.20	43.67	63.78	37.27	0.00	15.58
Apr	0.00	11.05	25.97	34.64	66.51	35.76	0.00	15.13
May	0.00	13.94	34.42	40.71	84.60	29.47	0.00	40.64
Jun	0.00	15.87	46.73	43.84	75.89	31.26	0.00	42.18
Jul	0.00	12.16	51.06	40.37	75.98	33.56	0.00	47.27
Aug	0.00	18.20	45.35	41.32	76.73	33.21	0.00	37.79
Sep	0.00	19.41	51.61	43.05	76.92	33.54	0.00	37.36
Oct	0.00	20.94	44.12	47.55	68.04	30.03	0.00	29.18
Nov	0.00	9.43	50.97	33.12	64.91	45.88	0.00	38.84
Dec	0.00	8.59	42.59	35.43	64.18	40.75	0.00	23.93

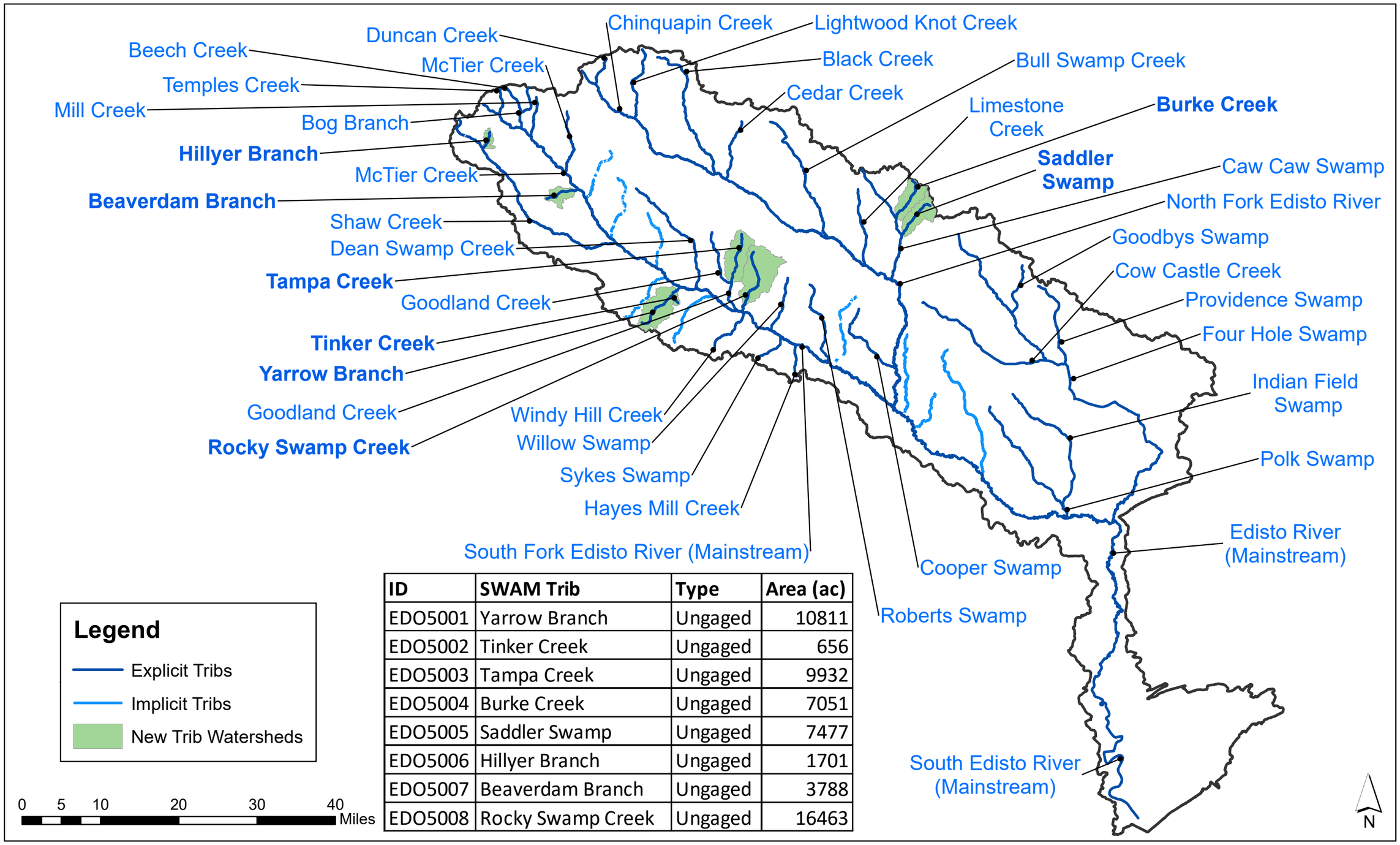
Notes:

[1] This reflects the small portion of withdrawals that are returned in the Edisto basin.

[2] Returns are in the Santee basin.

Table 10. Baseline Model Monthly Return Flows for Discharge Objects

Monthly Return Flow (MGD)				
Month	**KY-TN Clay**	**Orangeburg Fish**	**ECWSA Import**	**Bowman Import**
Jan	0.00	0.67	0.39	0.08
Feb	0.00	0.65	0.37	0.10
Mar	0.00	0.65	0.36	0.10
Apr	0.00	0.65	0.37	0.10
May	0.00	0.68	0.32	0.09
Jun	0.00	0.61	0.28	0.16
Jul	0.00	0.61	0.26	0.08
Aug	0.00	0.61	0.23	0.08
Sep	0.00	0.62	0.21	0.09
Oct	0.00	0.62	0.22	0.08
Nov	0.00	1.23	0.25	0.07
Dec	0.00	0.62	0.33	0.11



ID	SWAM Trib	Type	Area (ac)
EDO5001	Yarrow Branch	Ungaged	10811
EDO5002	Tinker Creek	Ungaged	656
EDO5003	Tampa Creek	Ungaged	9932
EDO5004	Burke Creek	Ungaged	7051
EDO5005	Saddler Swamp	Ungaged	7477
EDO5006	Hillyer Branch	Ungaged	1701
EDO5007	Beaverdam Branch	Ungaged	3788
EDO5008	Rocky Swamp Creek	Ungaged	16463

Figure 1. Drainage Areas for New Explicit Tributaries in the Edisto River Basin

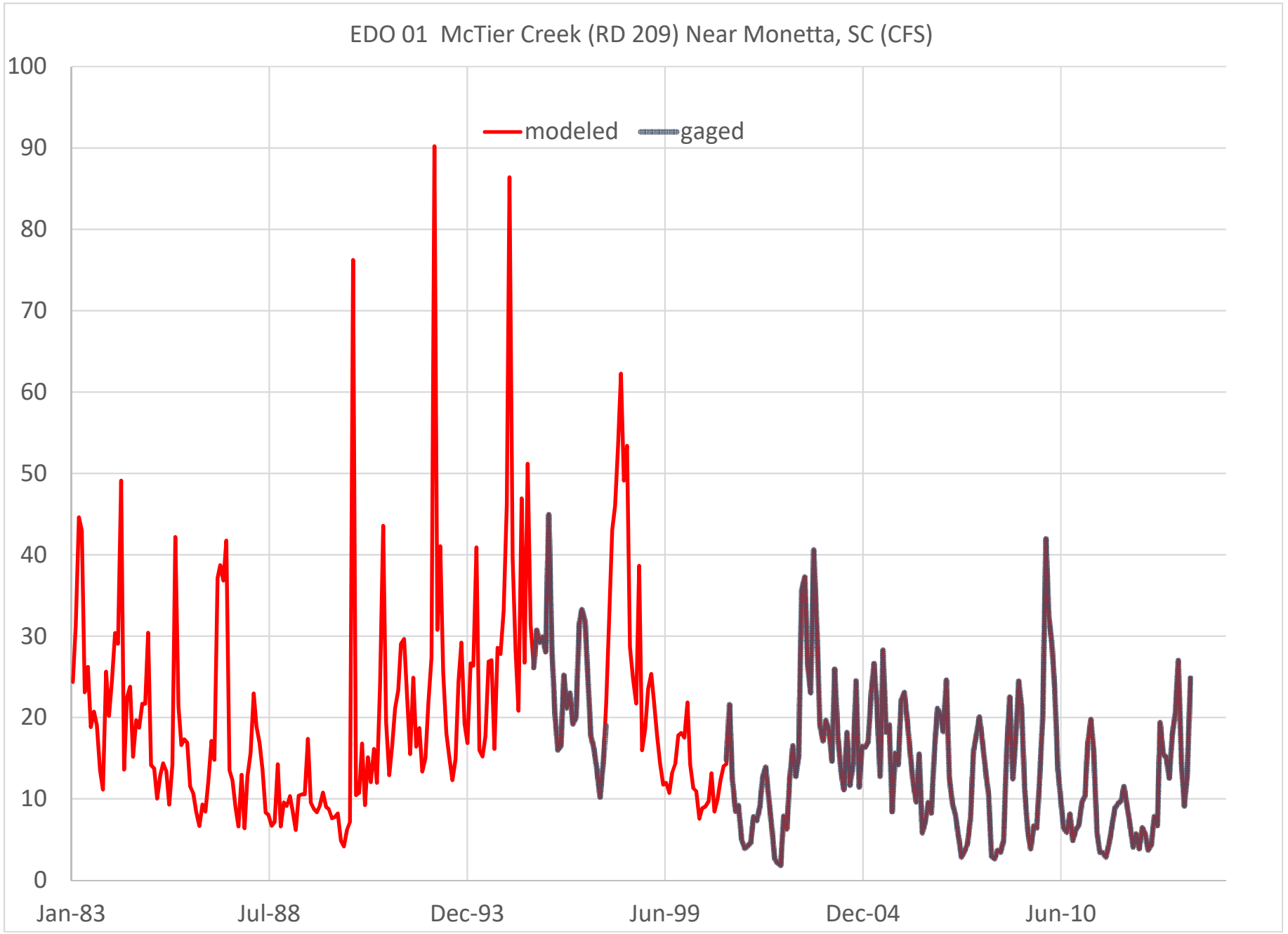
2020 Edisto SWAM Model Updates

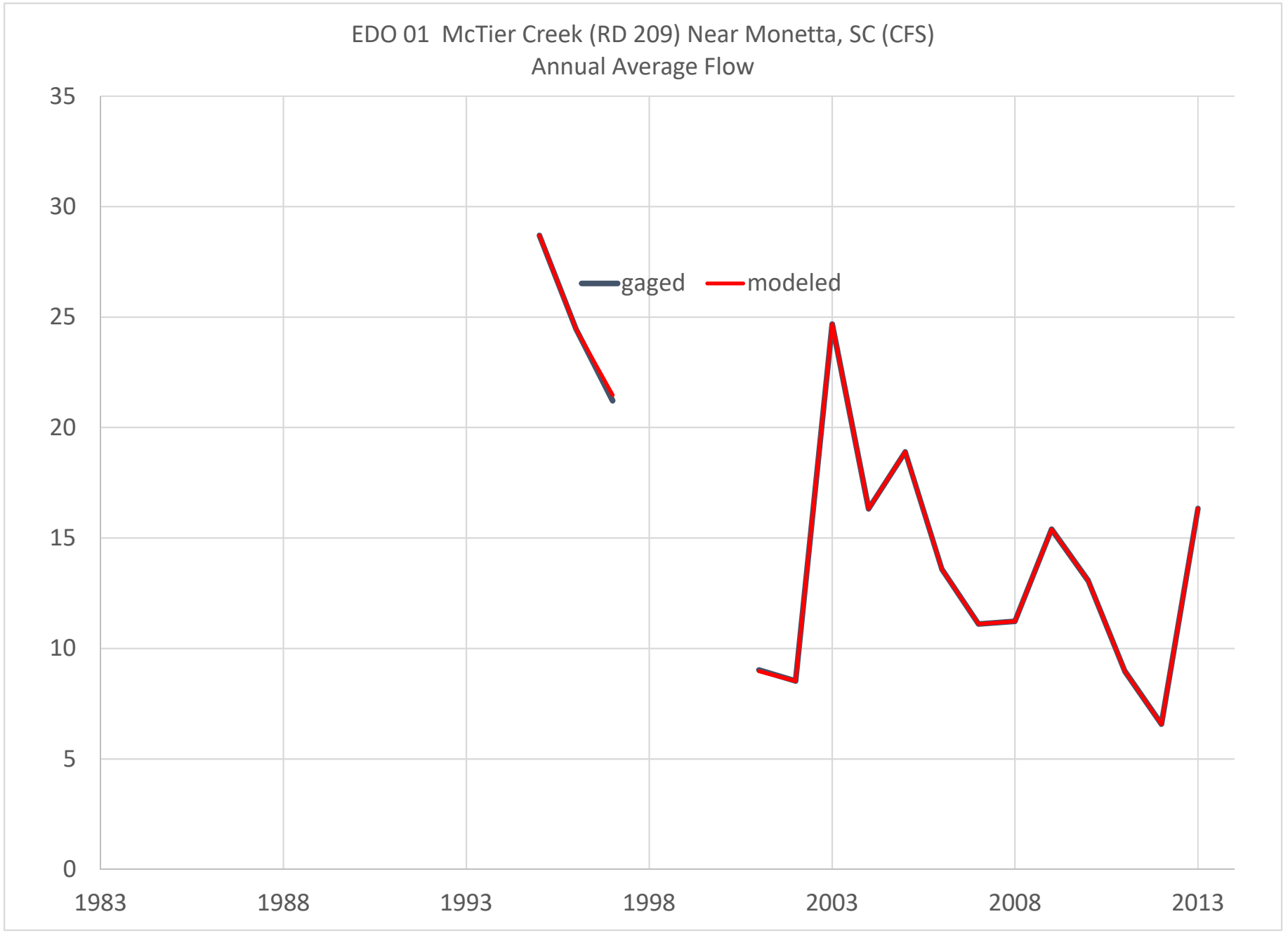
Attachment B

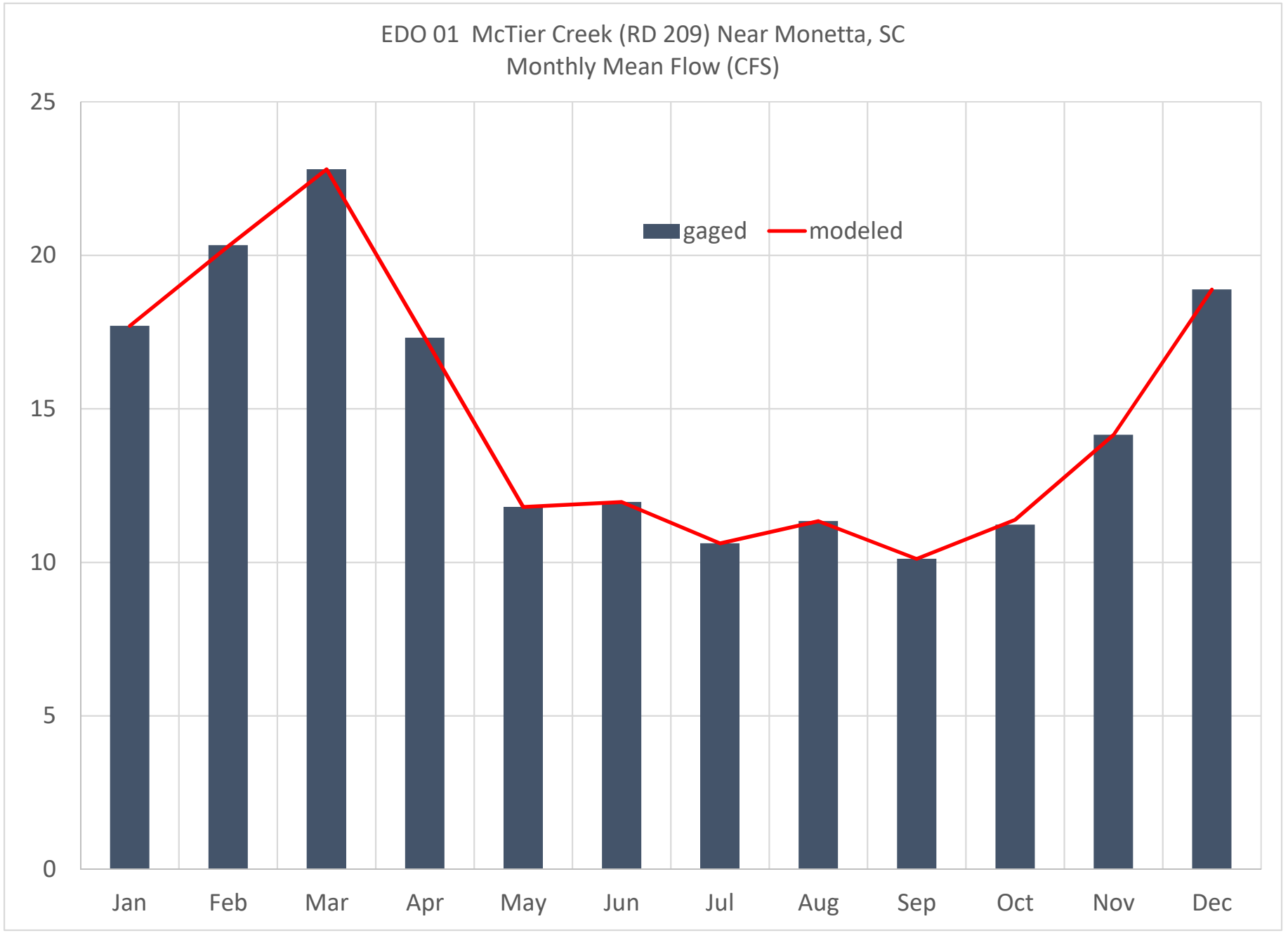
Calibration Model Results

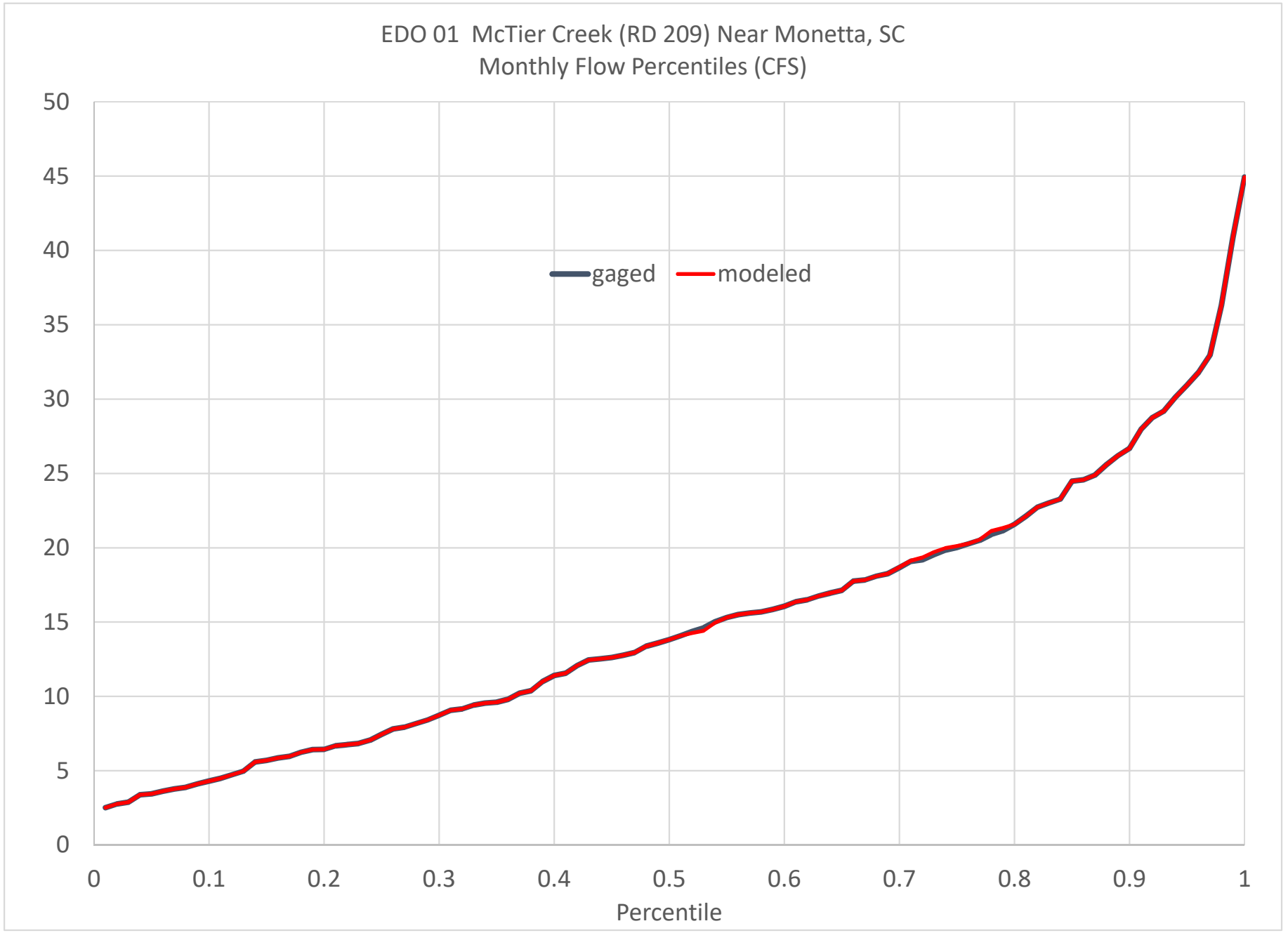
Attachment B

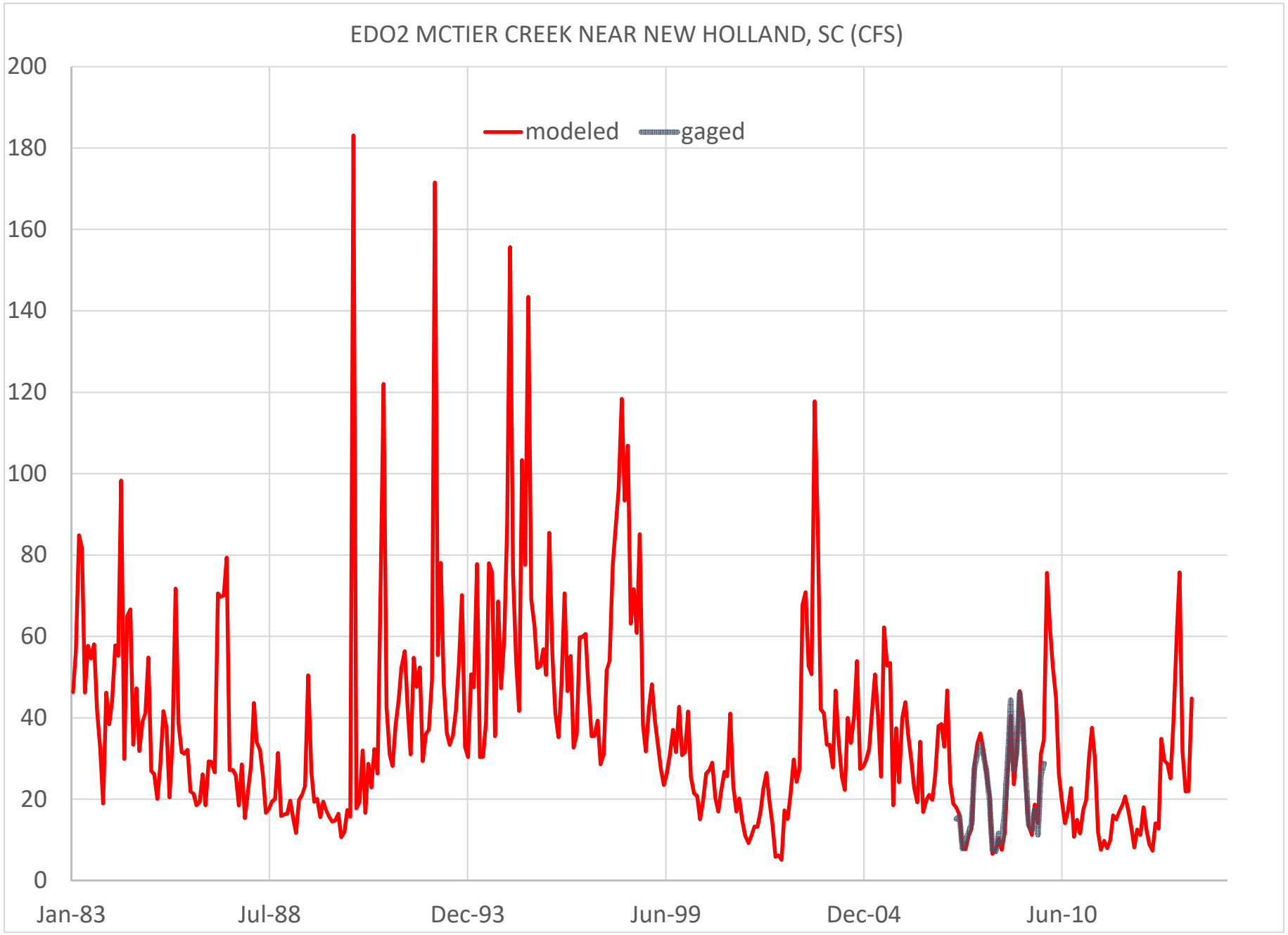
Monthly Calibration Model Results

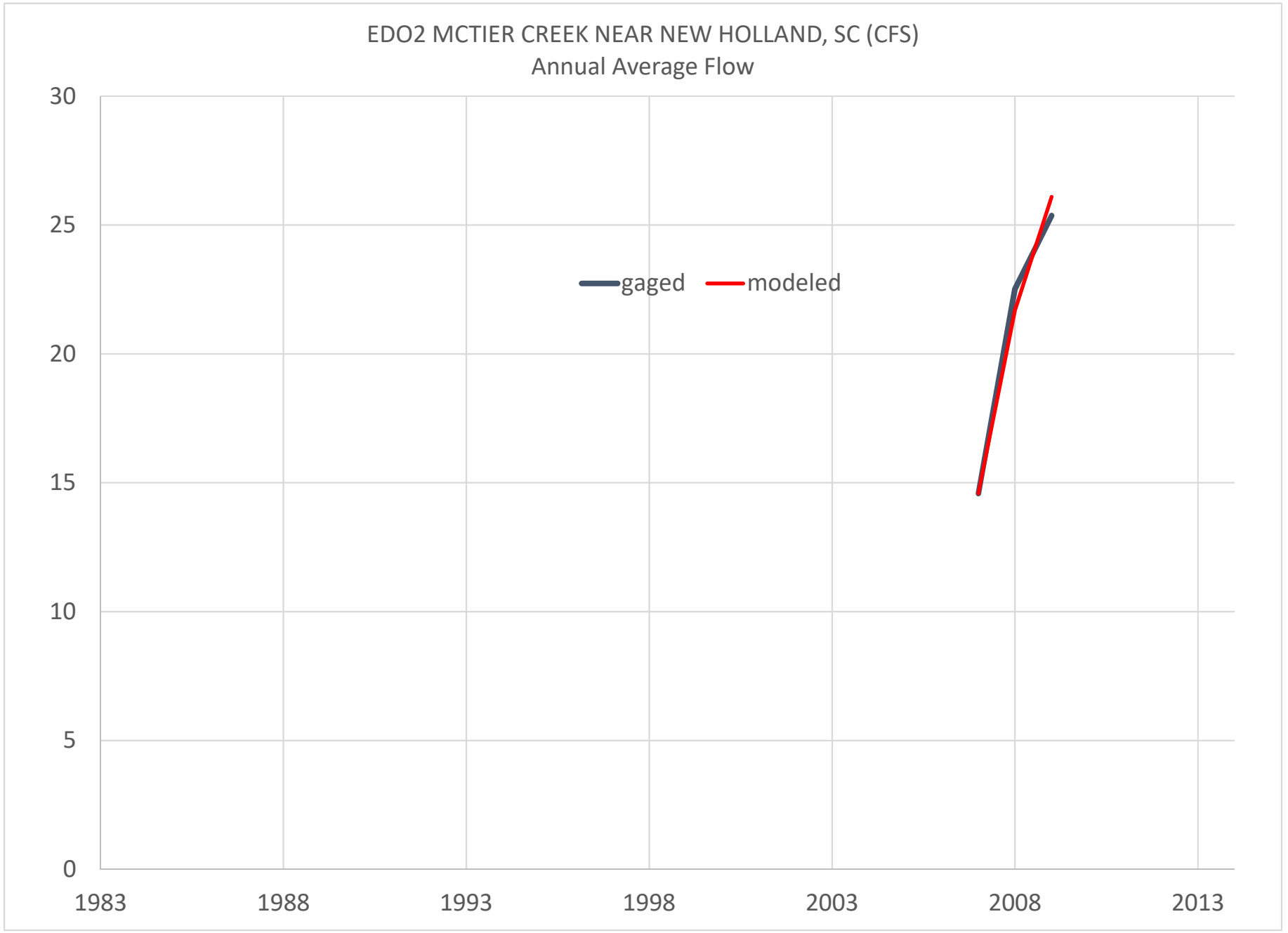

EDO 01 McTier Creek (RD 209) Near Monetta, SC (CFS)
modeled
gaged
100
90
80
70
60
50
40
30
20
10
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

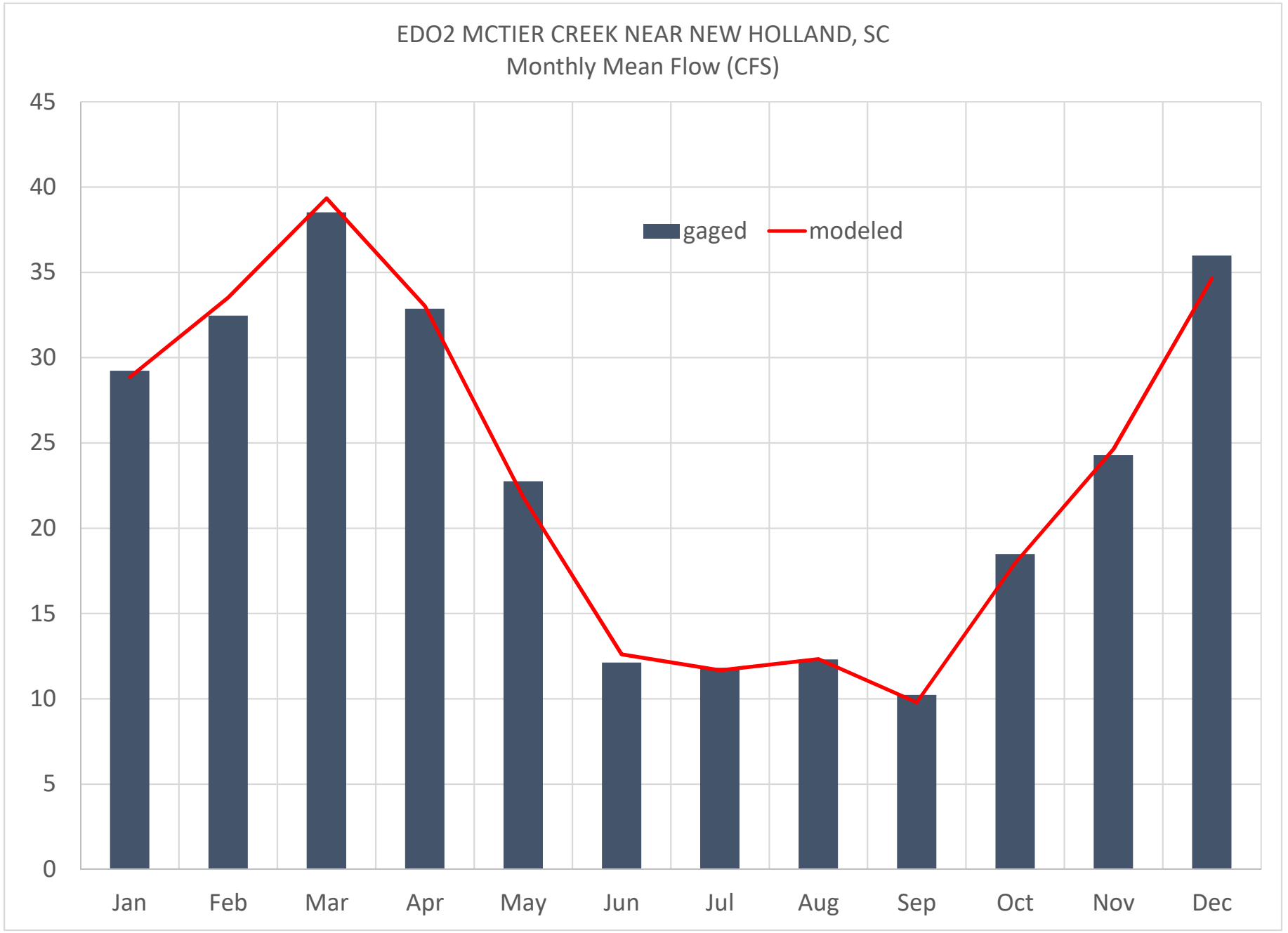

EDO 01 McTier Creek (RD 209) Near Monetta, SC (CFS)
Annual Average Flow
35
30
25
20
15
10
5
0
1983
1988
1993
1998
2003
2008
2013
gaged
modeled

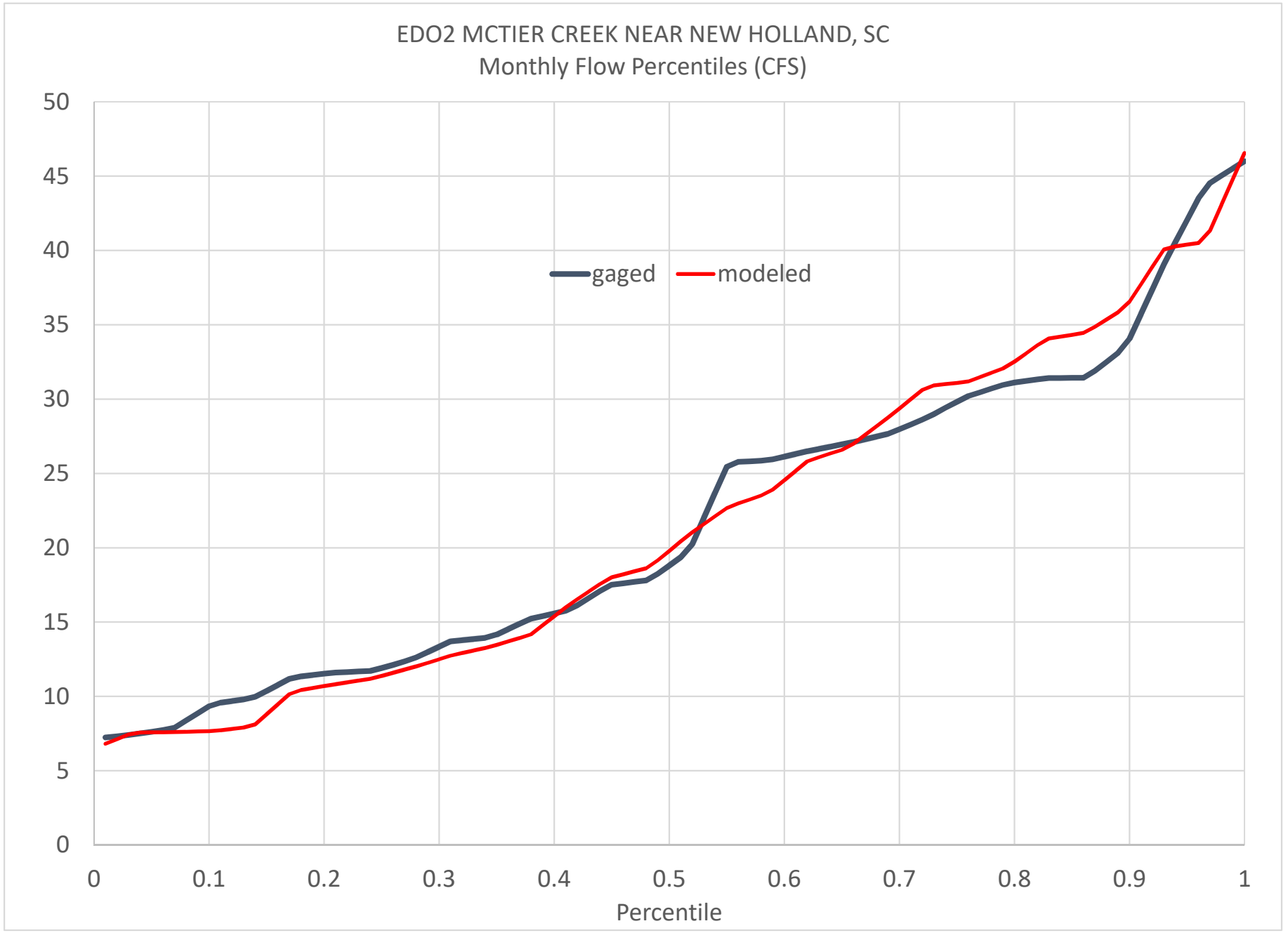

EDO 01 McTier Creek (RD 209) Near Monetta, SC
Monthly Mean Flow (CFS)
25
20
15
10
5
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

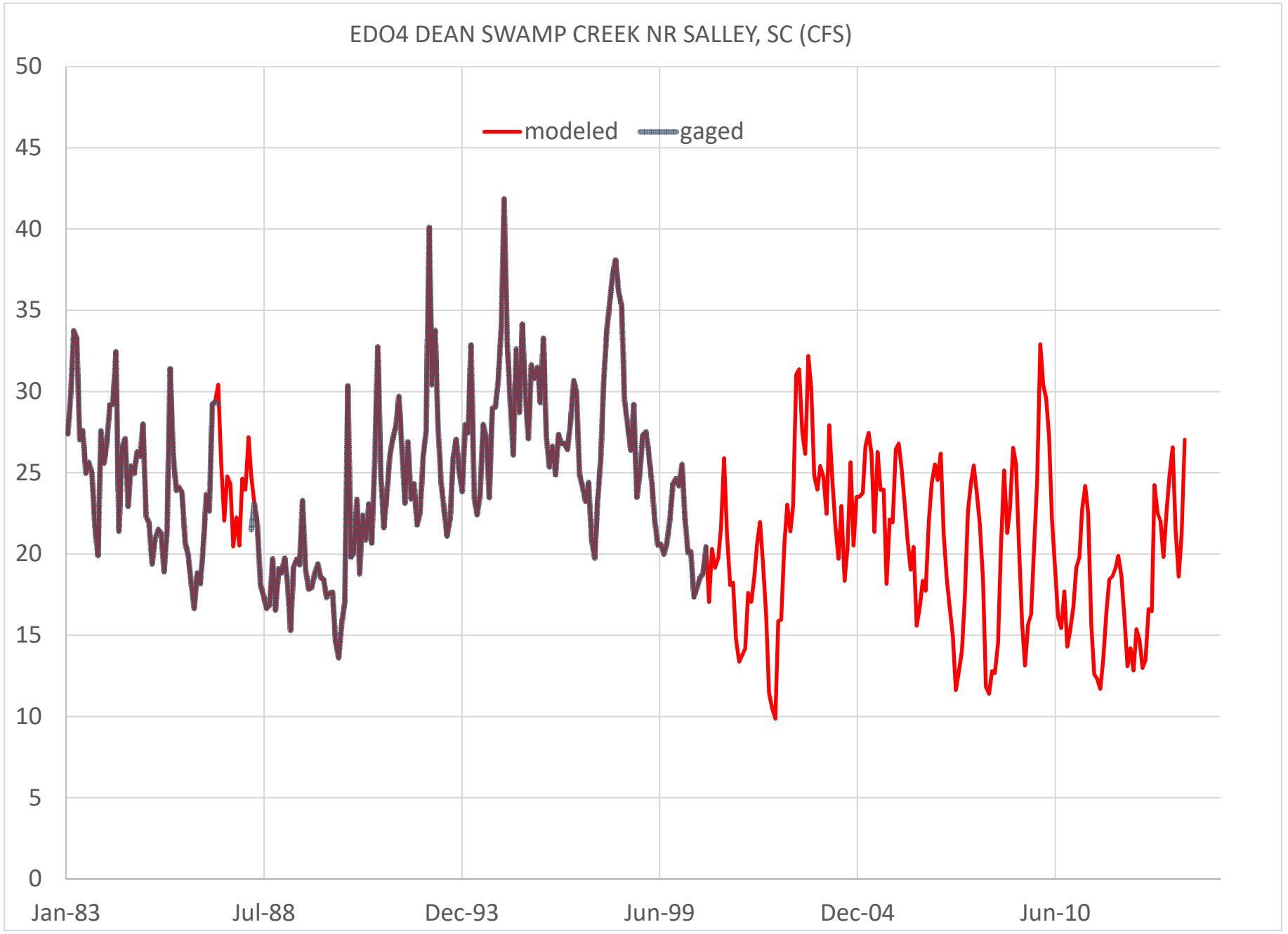

EDO 01 McTier Creek (RD 209) Near Monetta, SC
Monthly Flow Percentiles (CFS)
50
45
40
35
30
25
20
15
10
5
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

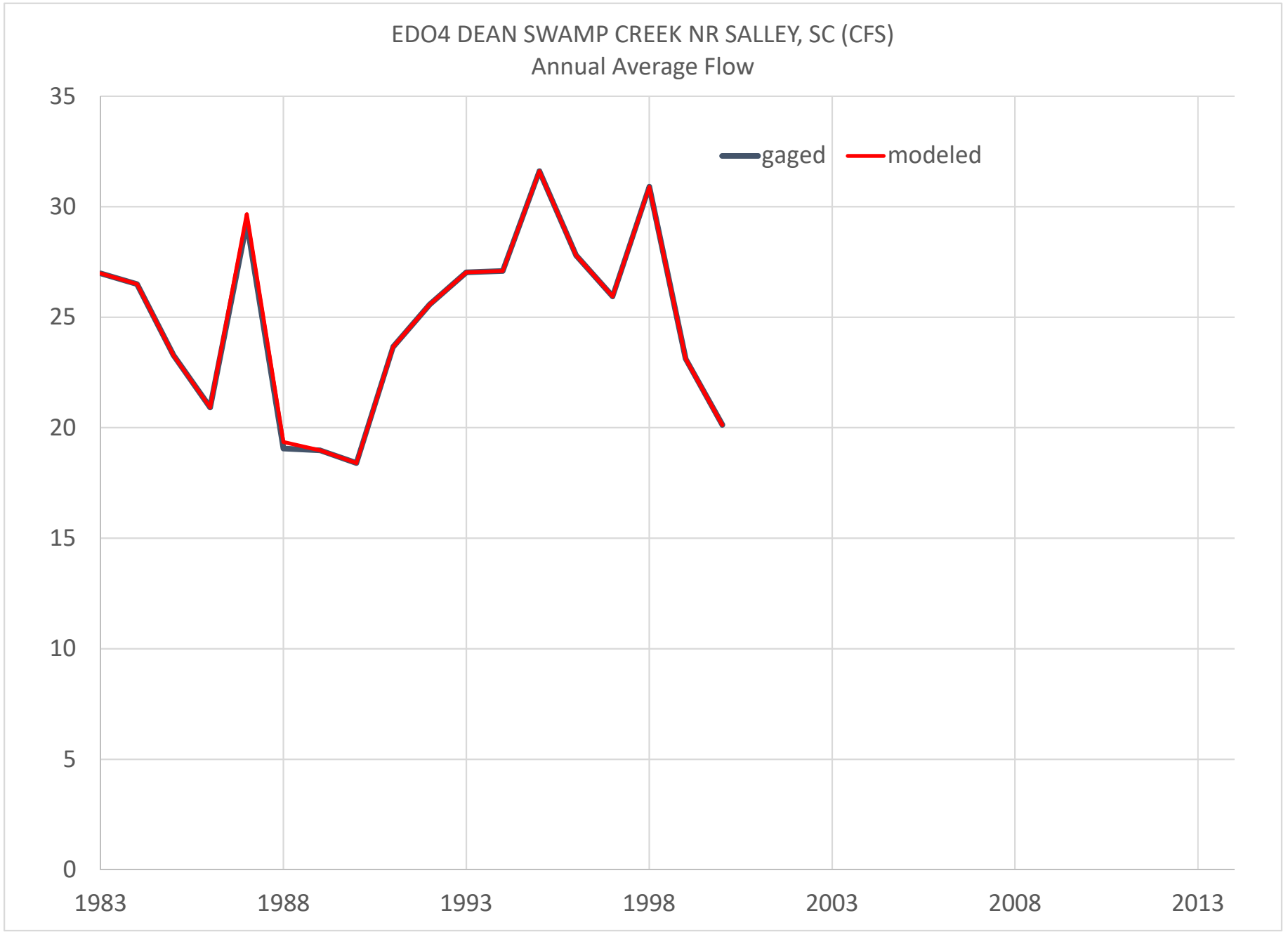

EDO2 MCTIER CREEK NEAR NEW HOLLAND, SC (CFS)
modeled
gaged
200
180
160
140
120
100
80
60
40
20
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

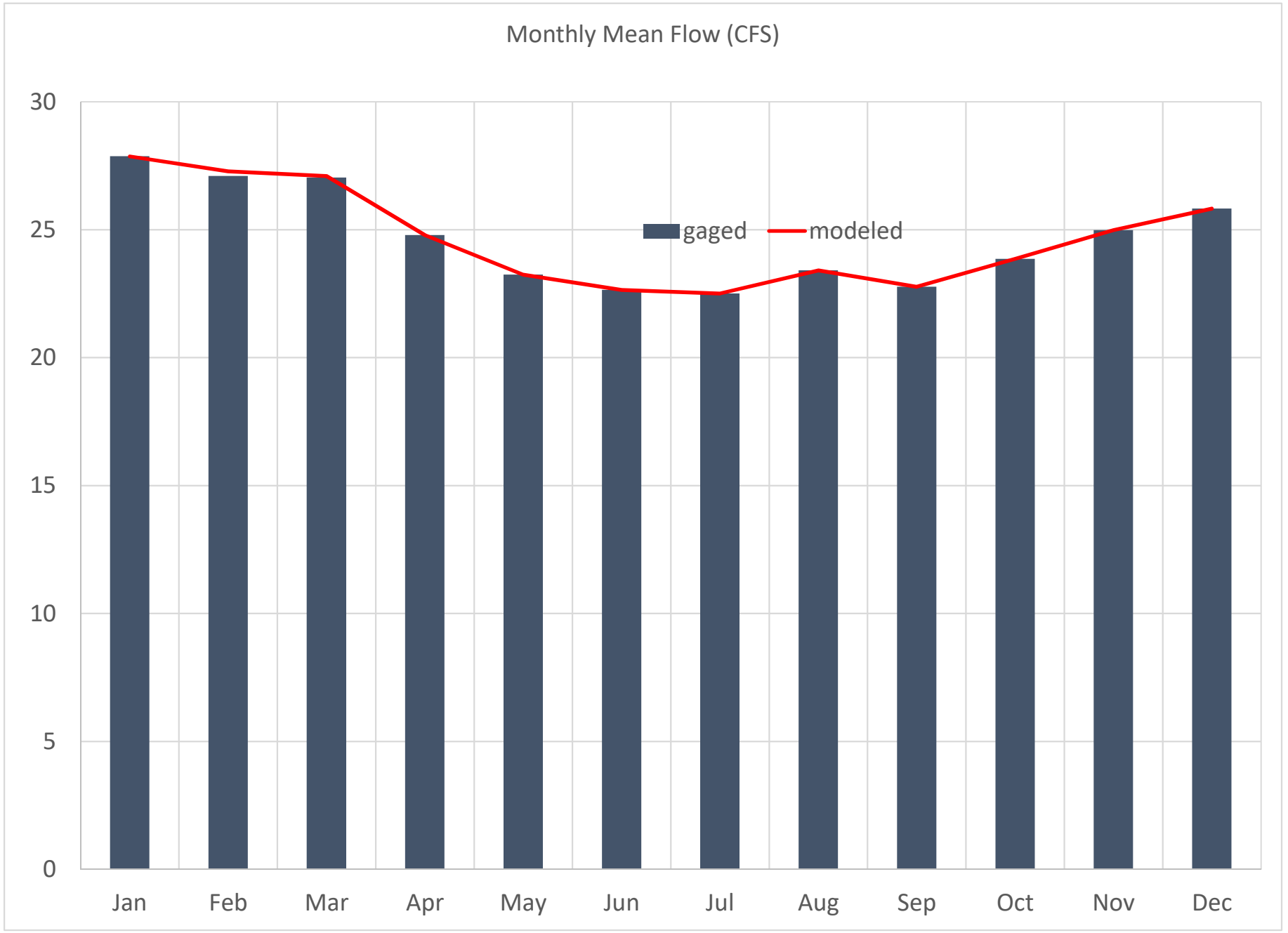

EDO2 MCTIER CREEK NEAR NEW HOLLAND, SC (CFS)
Annual Average Flow
30
25
20
15
10
5
0
1983
1988
1993
1998
2003
2008
2013
gaged
modeled

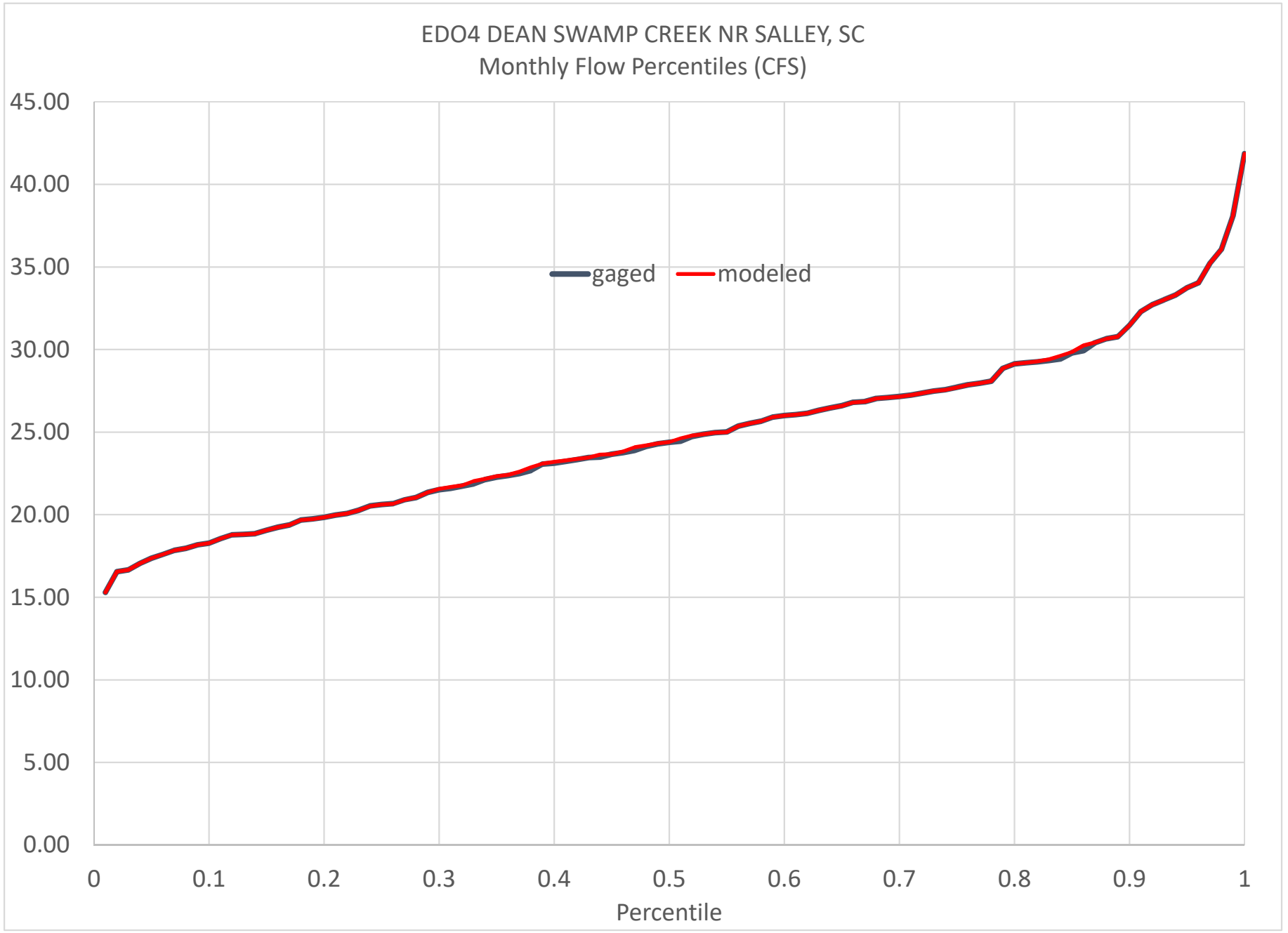

EDO2 MCTIER CREEK NEAR NEW HOLLAND, SC
Monthly Mean Flow (CFS)
45
40
35
30
25
20
15
10
5
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

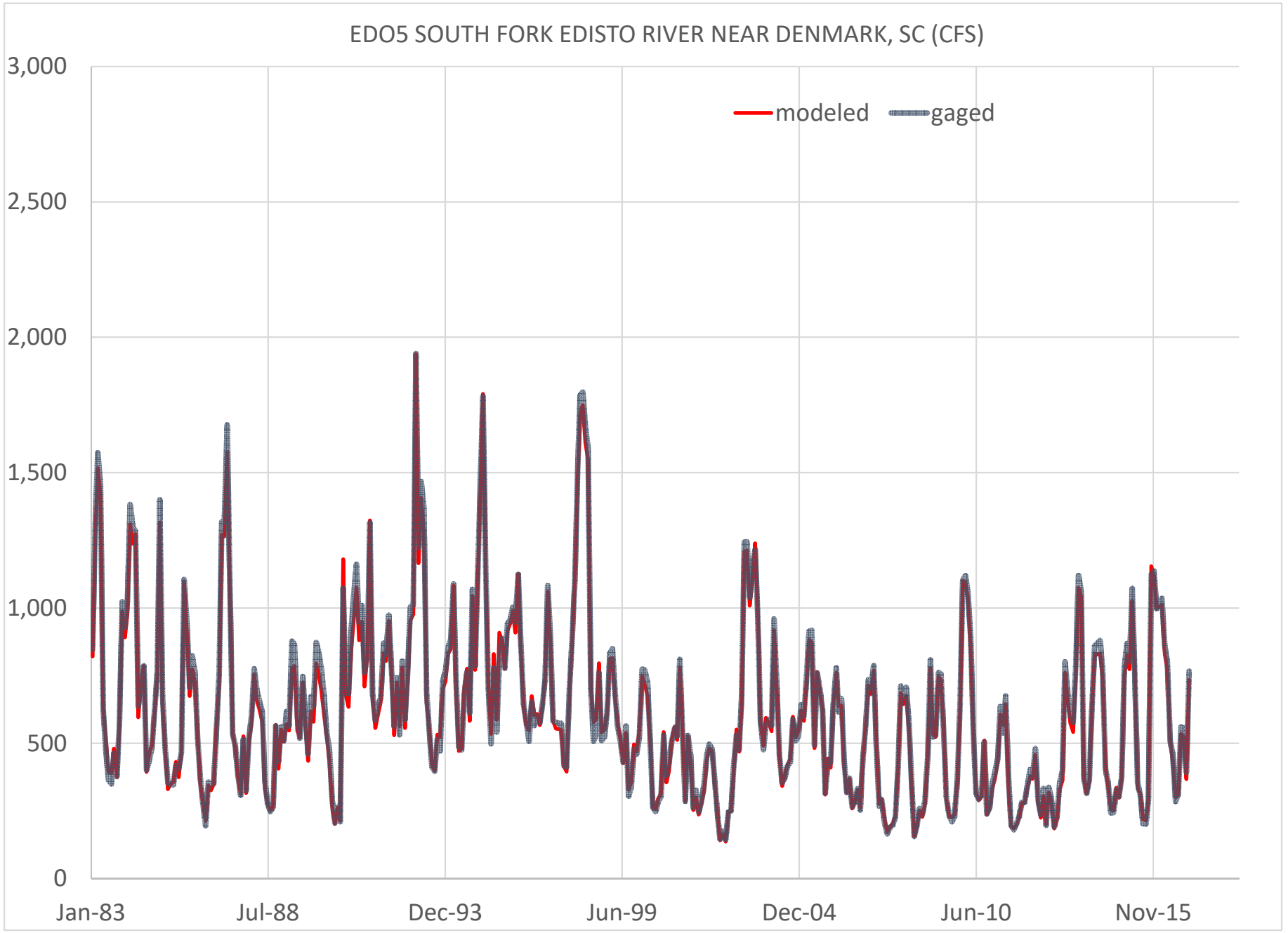

EDO2 MCTIER CREEK NEAR NEW HOLLAND, SC
Monthly Flow Percentiles (CFS)
50
45
40
35
30
25
20
15
10
5
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

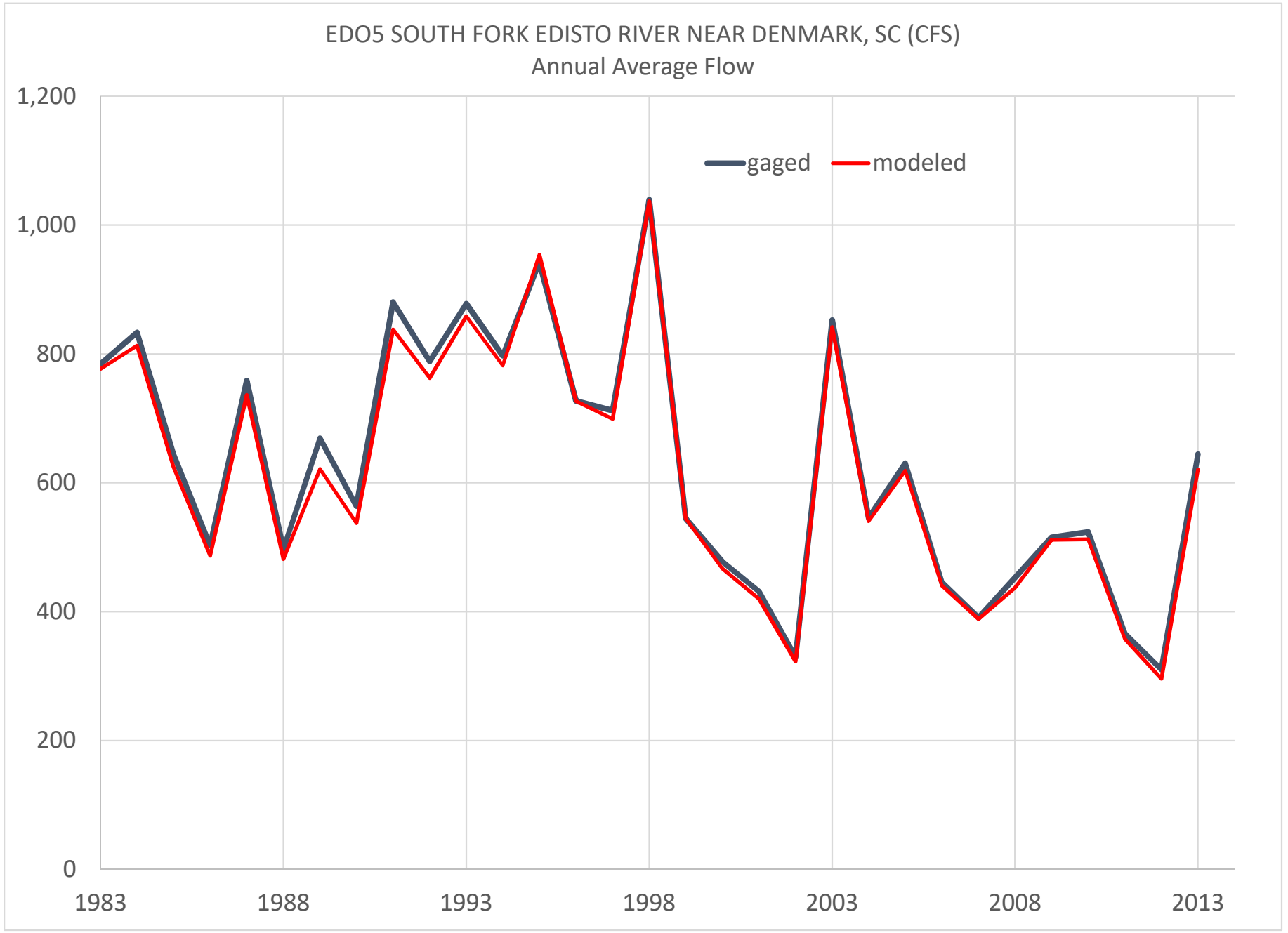

EDO4 DEAN SWAMP CREEK NR SALLEY, SC (CFS)
modeled
gaged
50
45
40
35
30
25
20
15
10
5
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

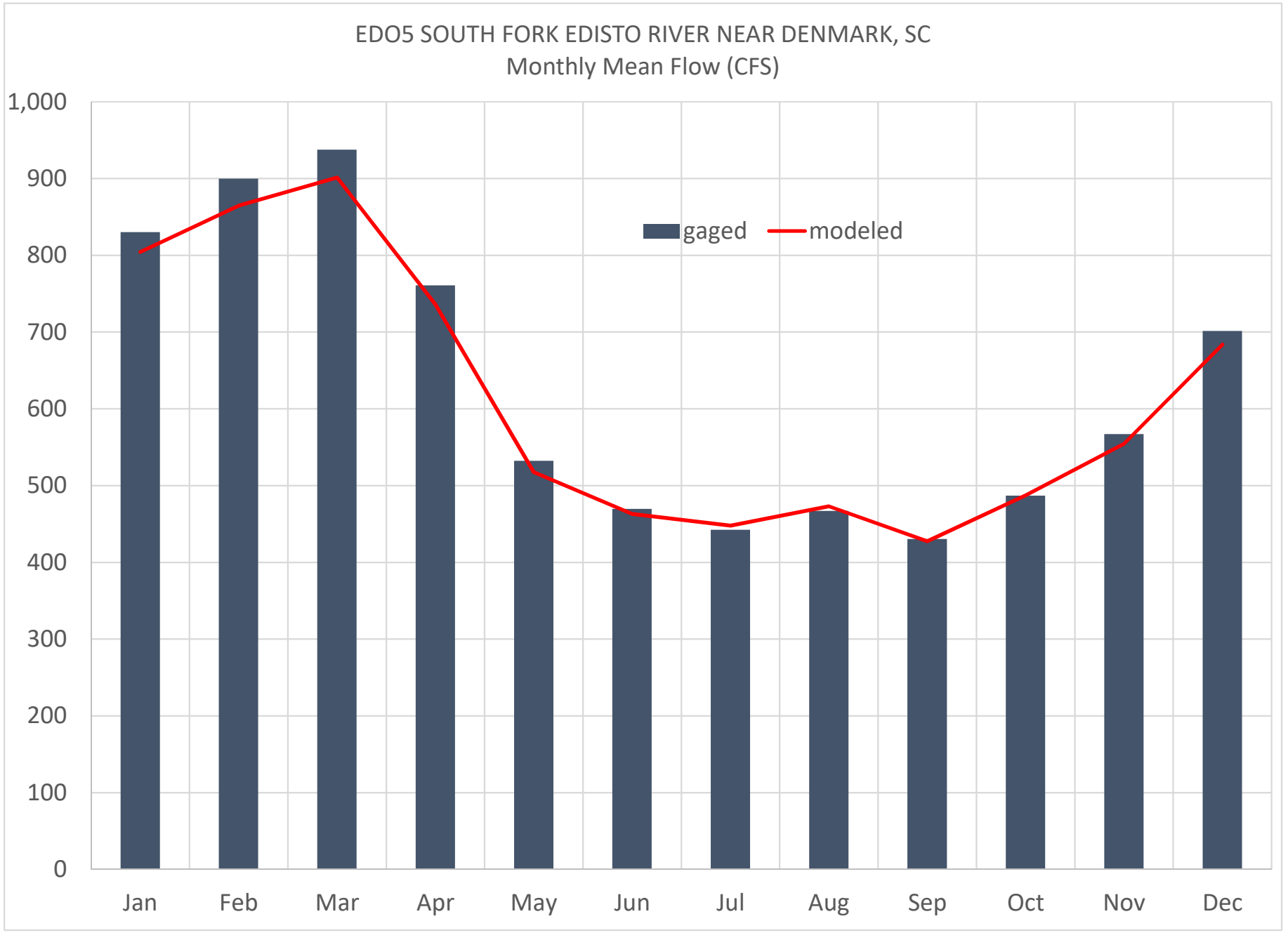

EDO4 DEAN SWAMP CREEK NR SALLEY, SC (CFS)
Annual Average Flow
gaged
modeled
35
30
25
20
15
10
5
0
1983
1988
1993
1998
2003
2008
2013

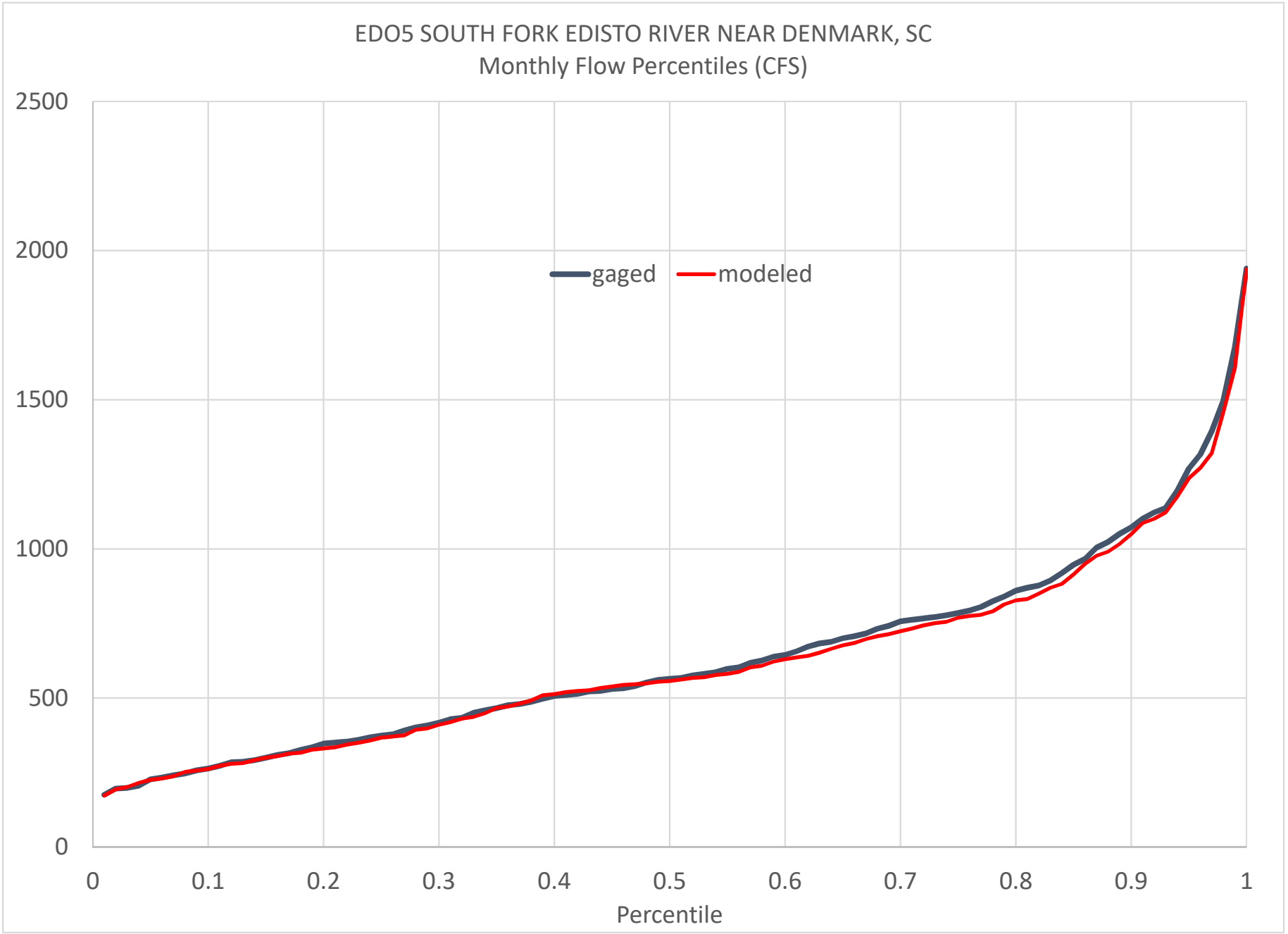

Monthly Mean Flow (CFS)
30
25
20
15
10
5
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

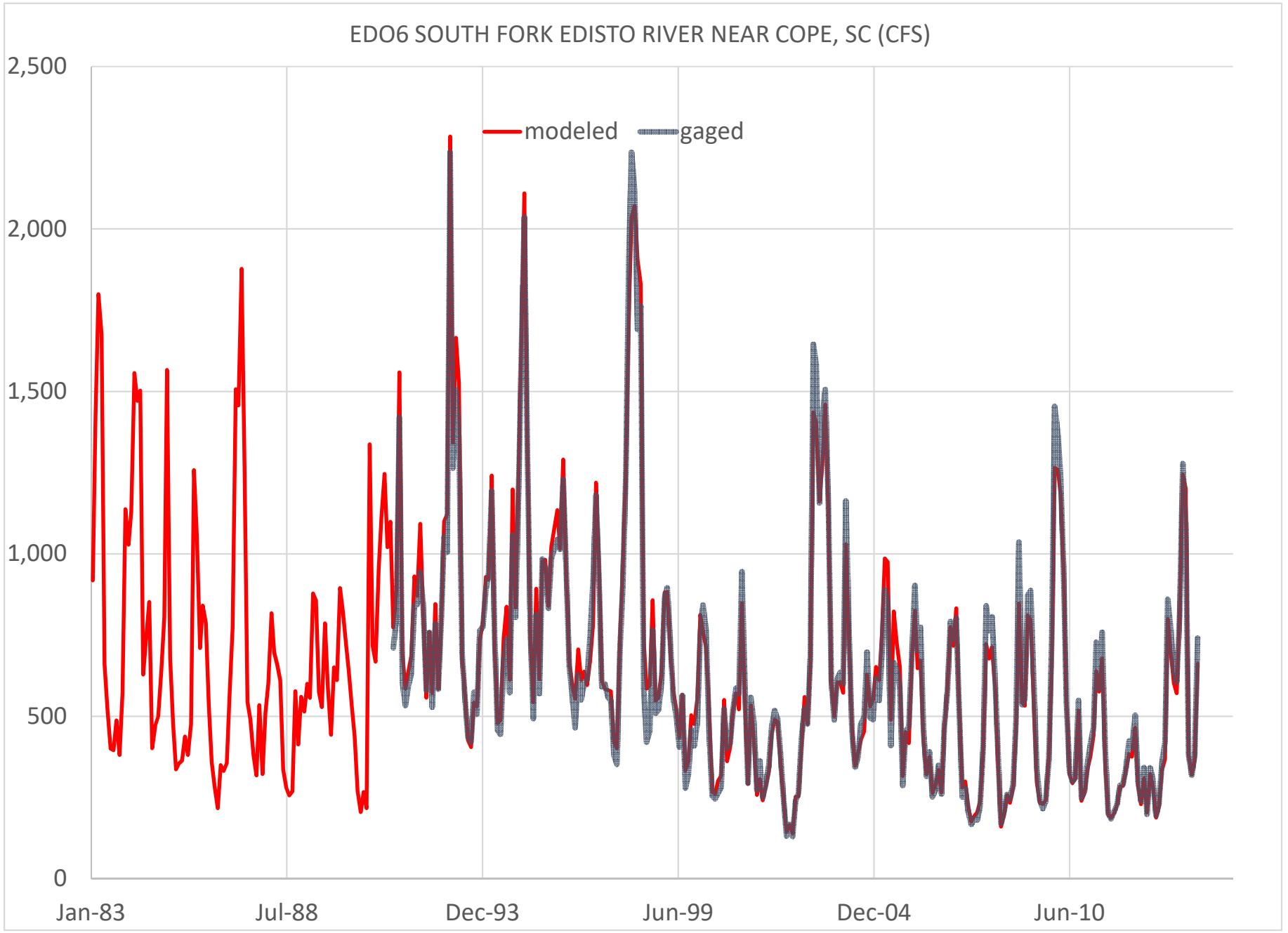

EDO4 DEAN SWAMP CREEK NR SALLEY, SC
Monthly Flow Percentiles (CFS)
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

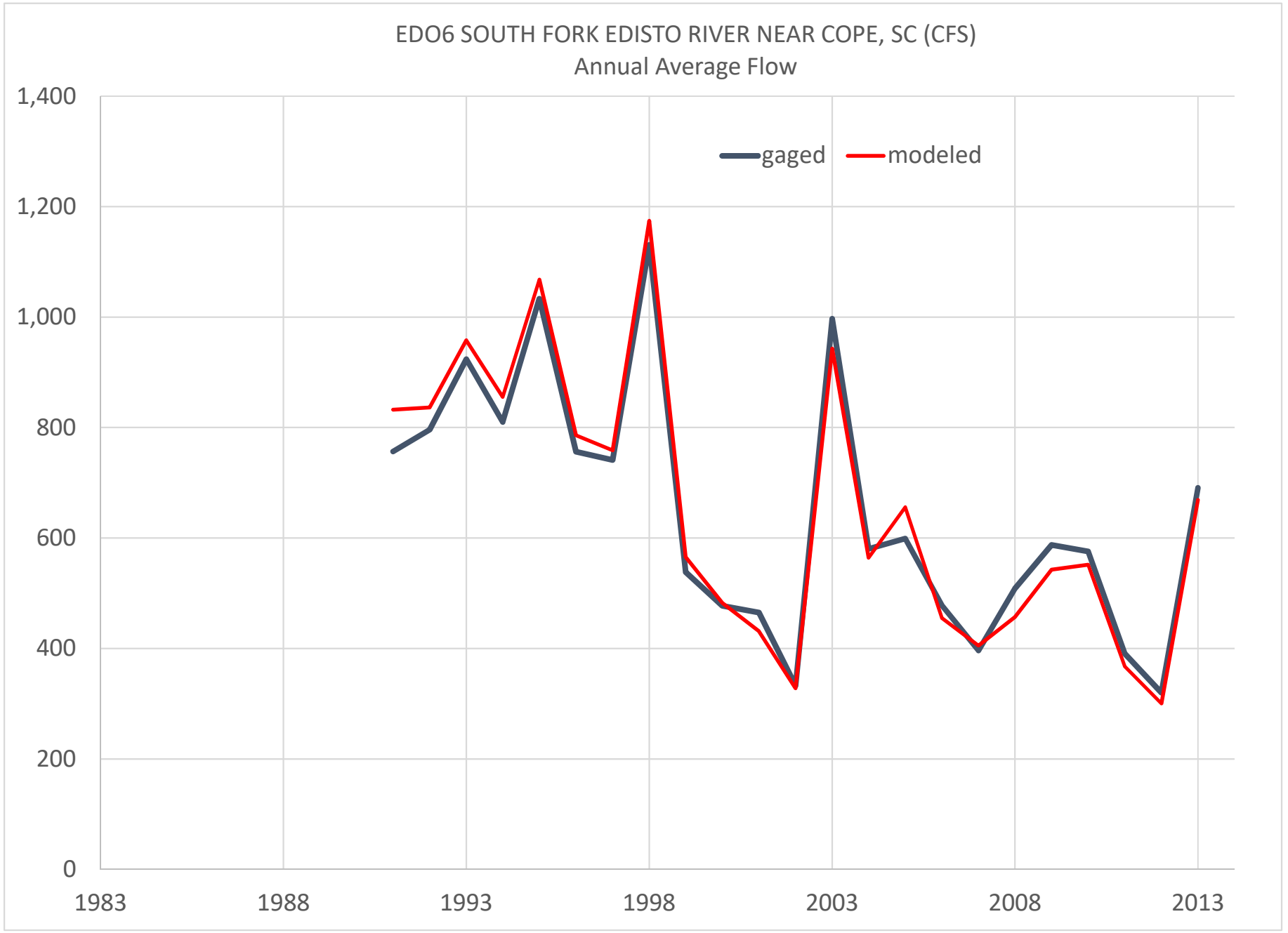

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC (CFS)
modeled
gaged
3,000
2,500
2,000
1,500
1,000
500
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10
Nov-15

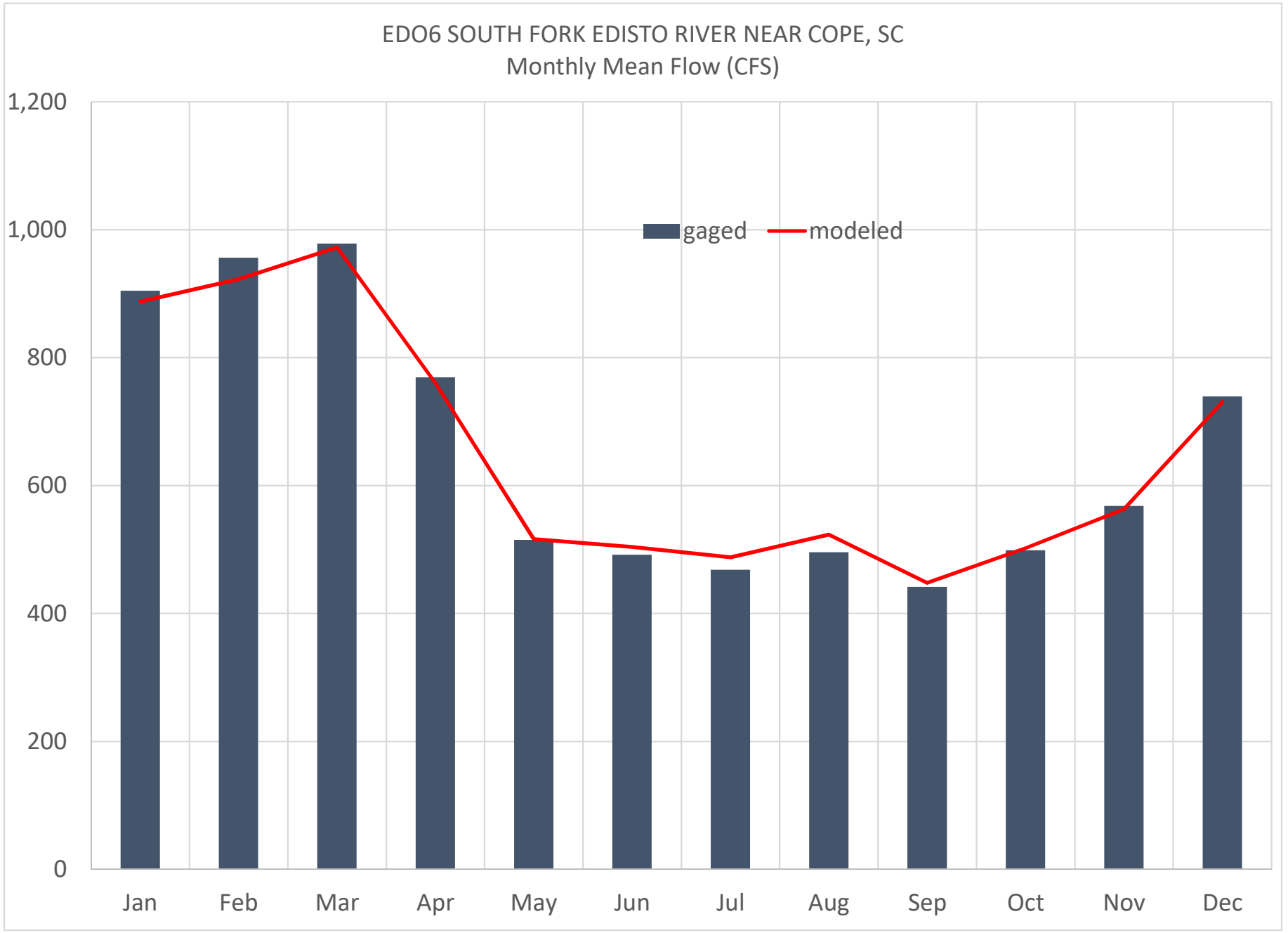

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC (CFS)
Annual Average Flow
gaged
modeled
1,200
1,000
800
600
400
200
0
1983
1988
1993
1998
2003
2008
2013

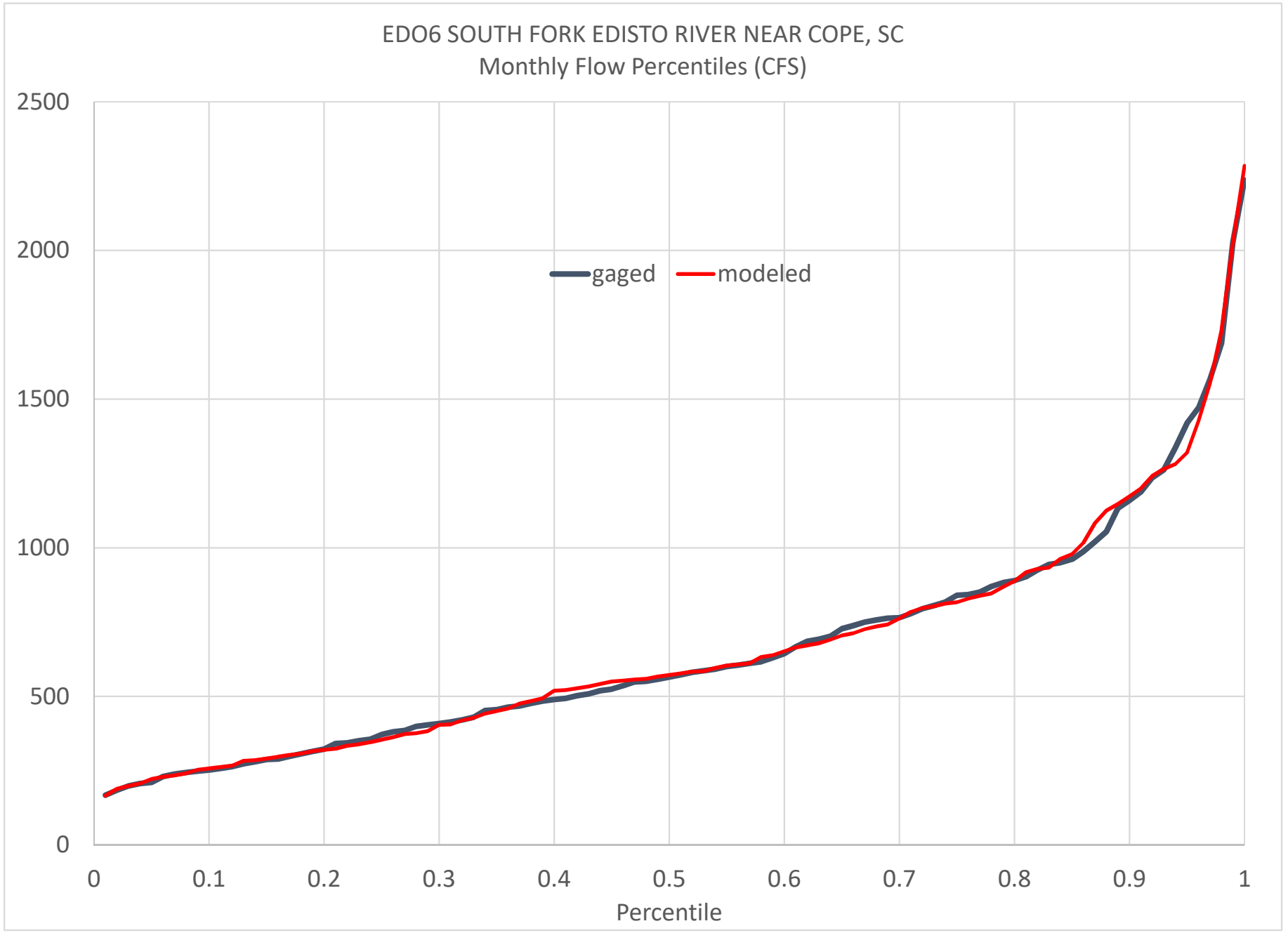

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC
Monthly Mean Flow (CFS)
1,000
900
800
700
600
500
400
300
200
100
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

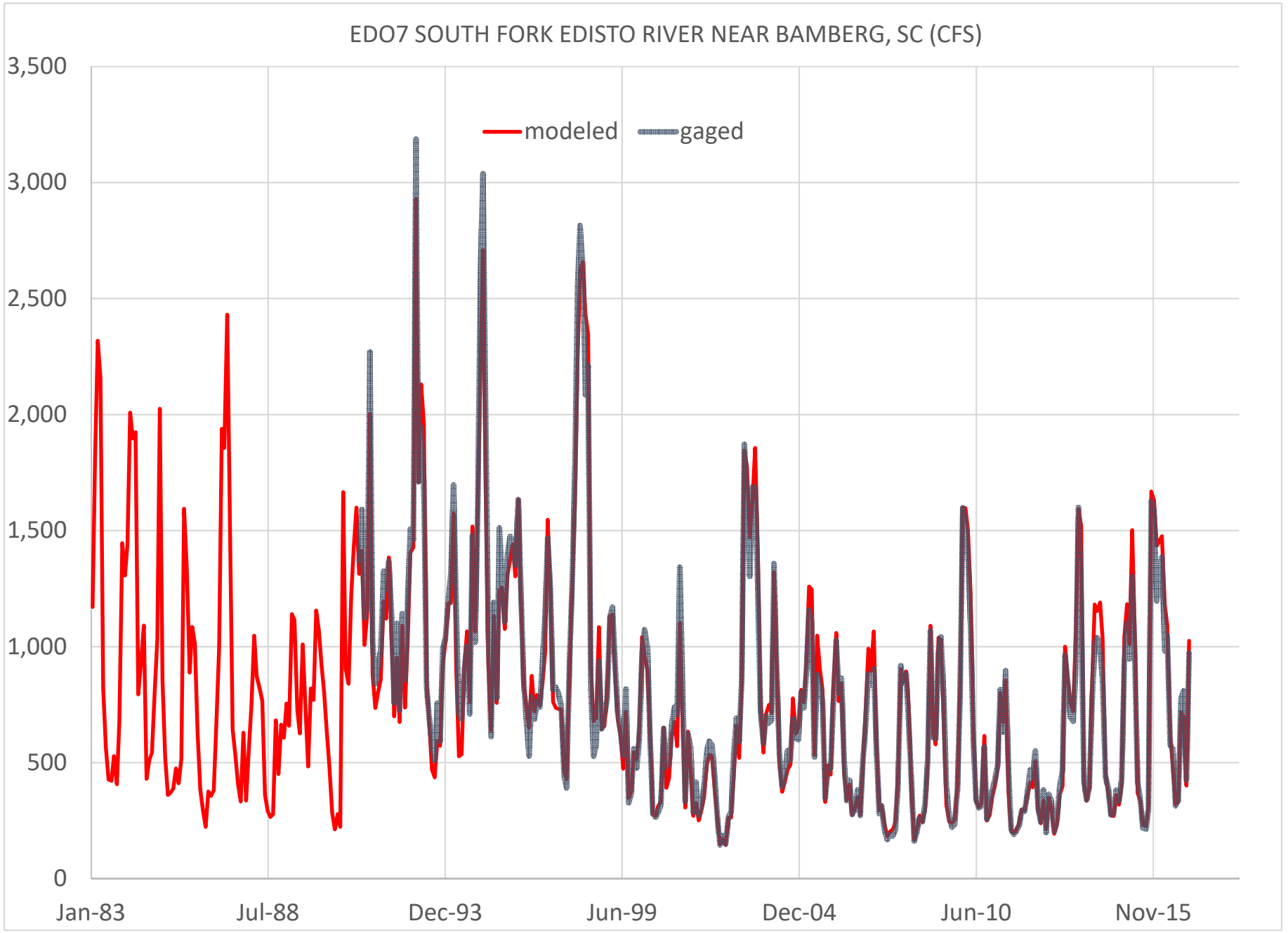

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC
Monthly Flow Percentiles (CFS)
2500
2000
1500
1000
500
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

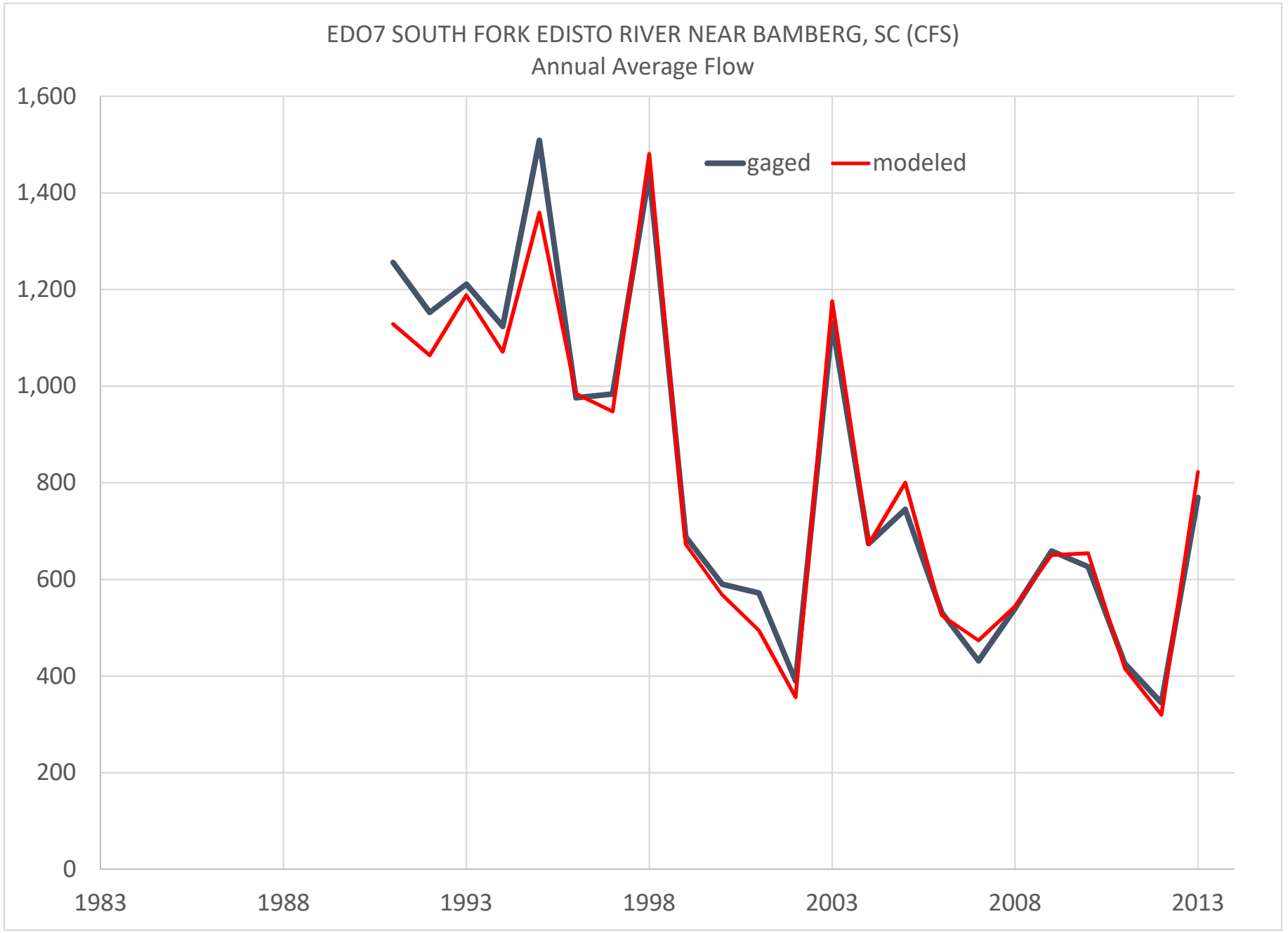

EDO6 SOUTH FORK EDISTO RIVER NEAR COPE, SC (CFS)
2,500
2,000
1,500
1,000
500
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

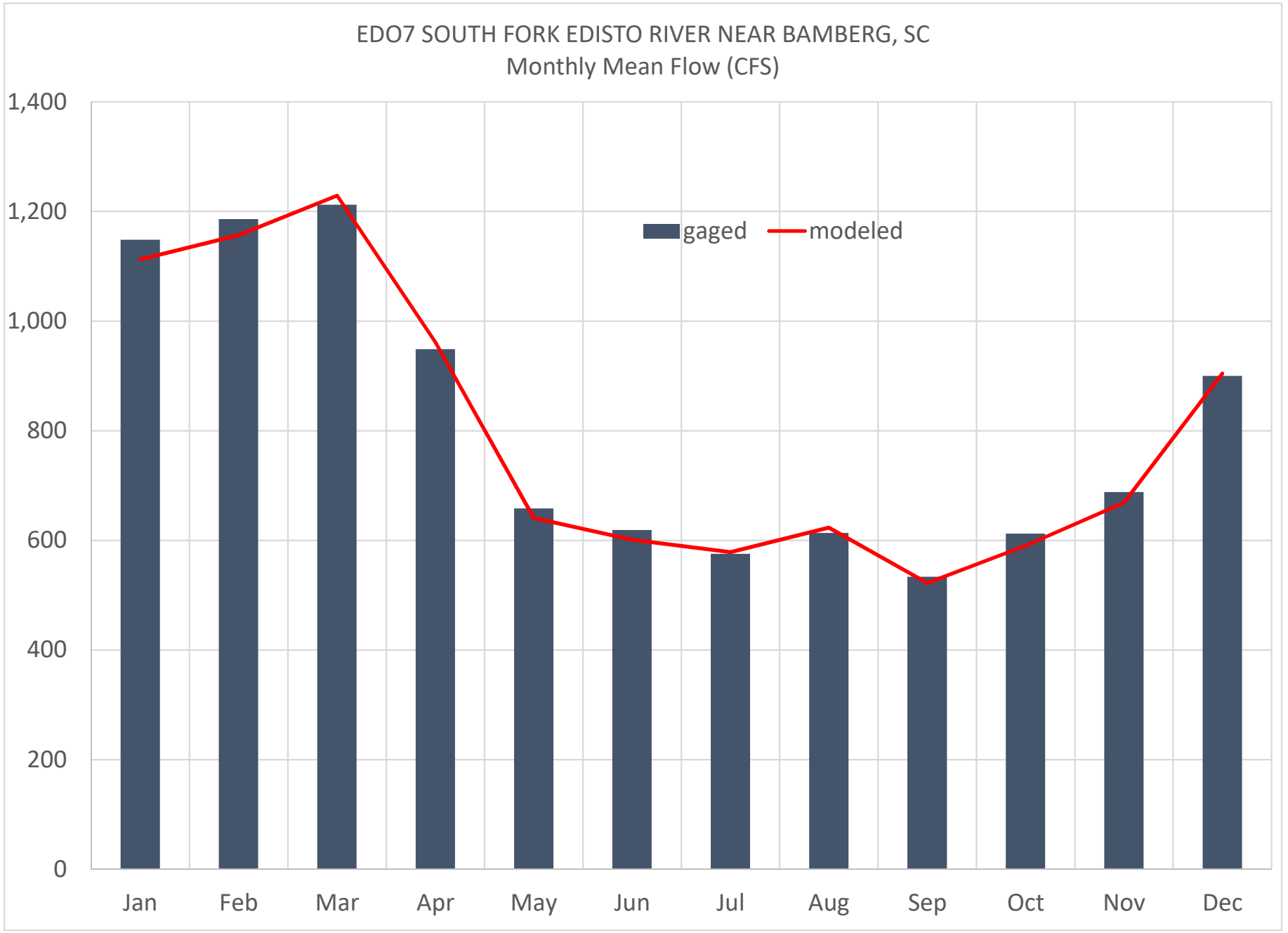

EDO6 SOUTH FORK EDISTO RIVER NEAR COPE, SC (CFS)
Annual Average Flow
gaged
modeled
1,400
1,200
1,000
800
600
400
200
0
1983
1988
1993
1998
2003
2008
2013

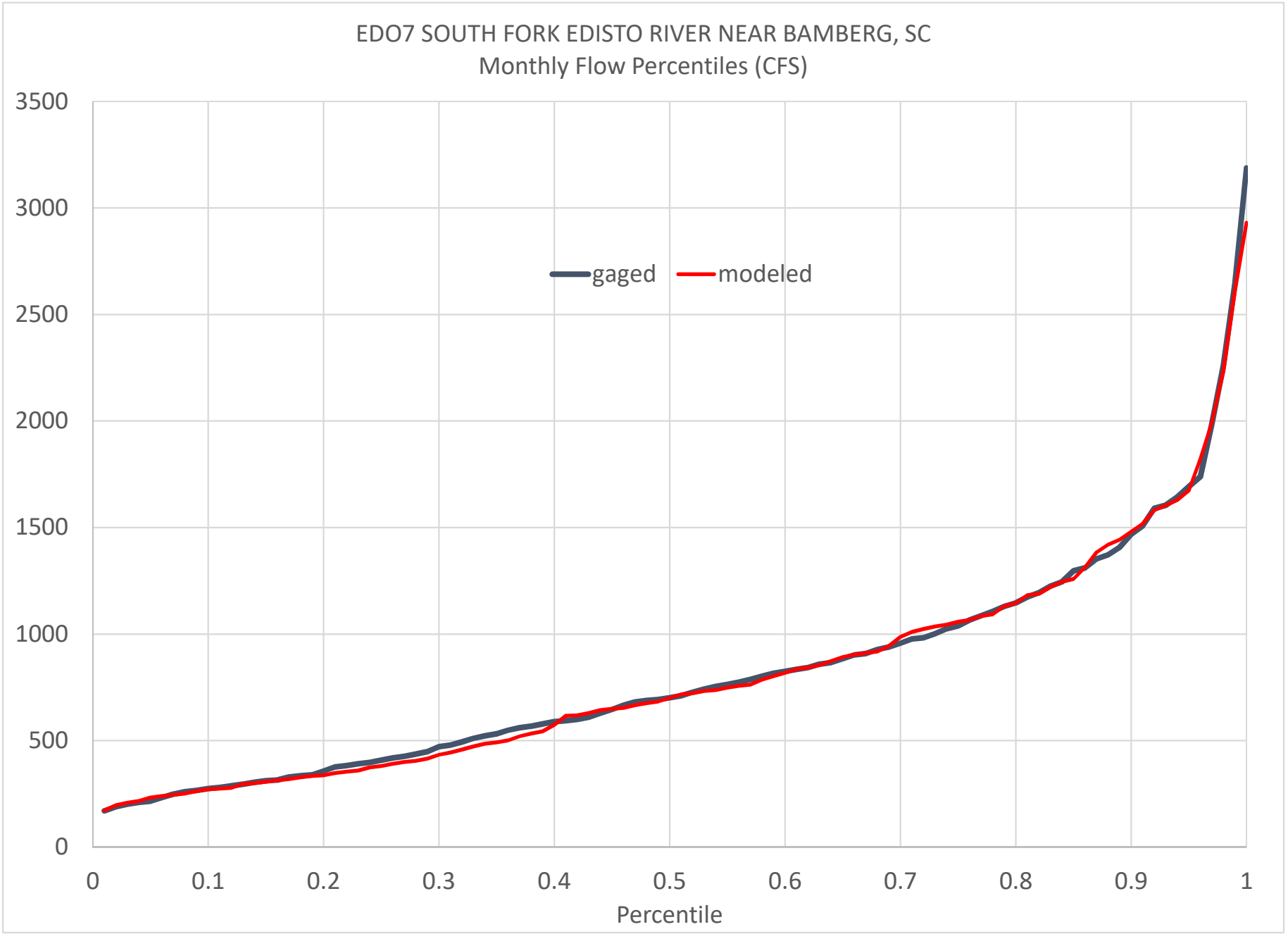

EDO6 SOUTH FORK EDISTO RIVER NEAR COPE, SC
Monthly Mean Flow (CFS)
1,200
1,000
800
600
400
200
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

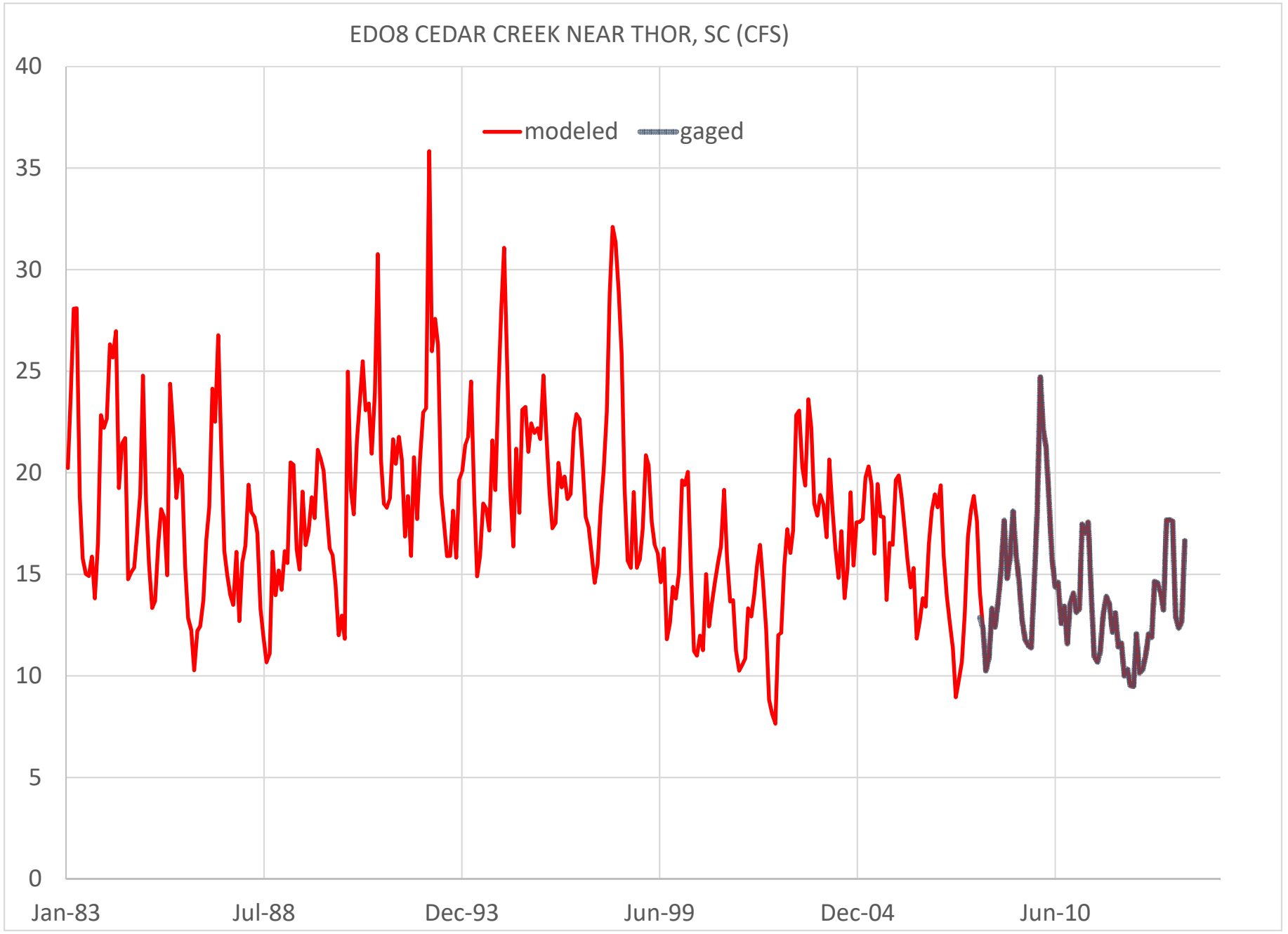

EDO6 SOUTH FORK EDISTO RIVER NEAR COPE, SC
Monthly Flow Percentiles (CFS)
2500
2000
1500
1000
500
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

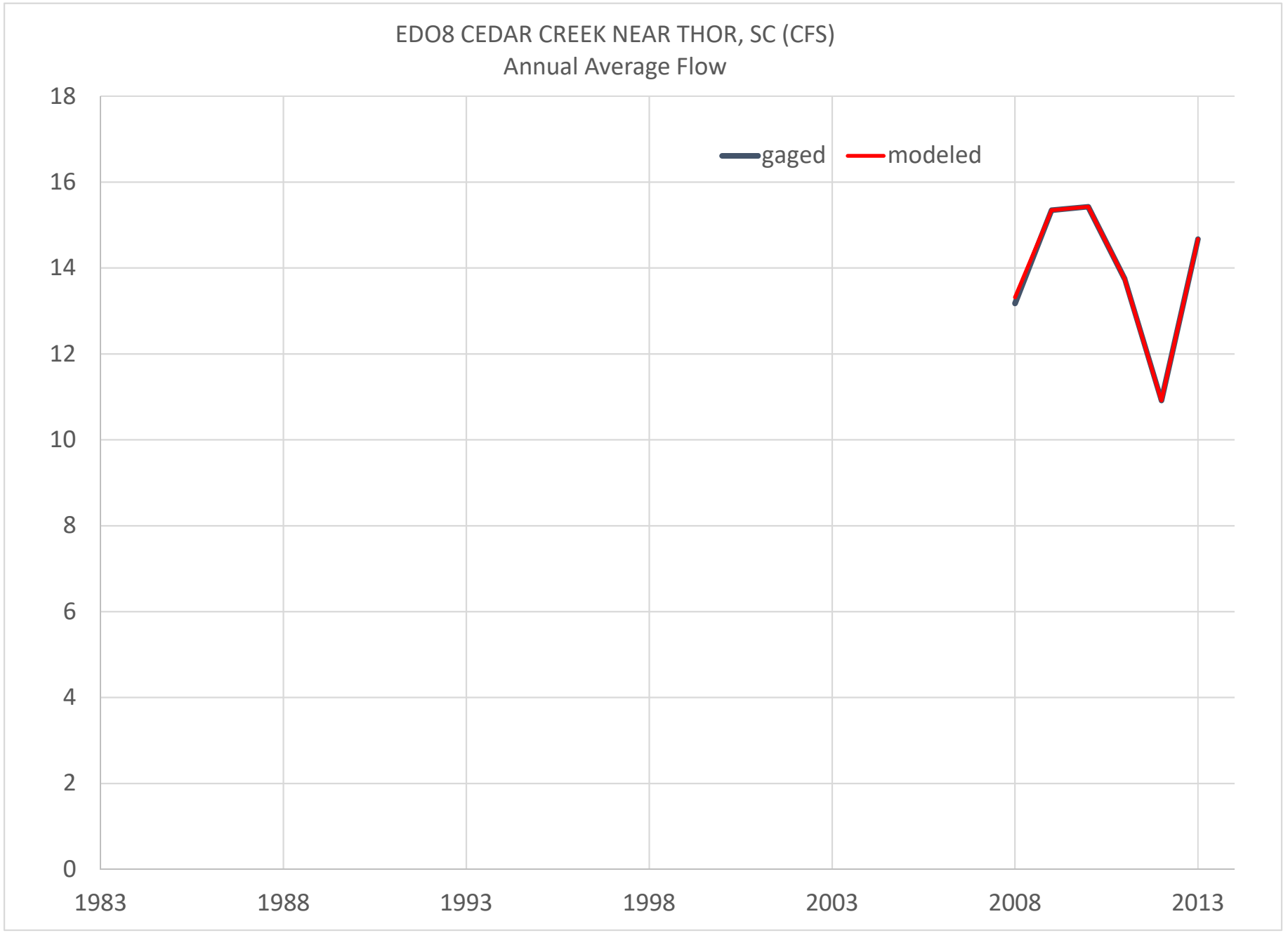

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC (CFS)
modeled
gaged
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10
Nov-15

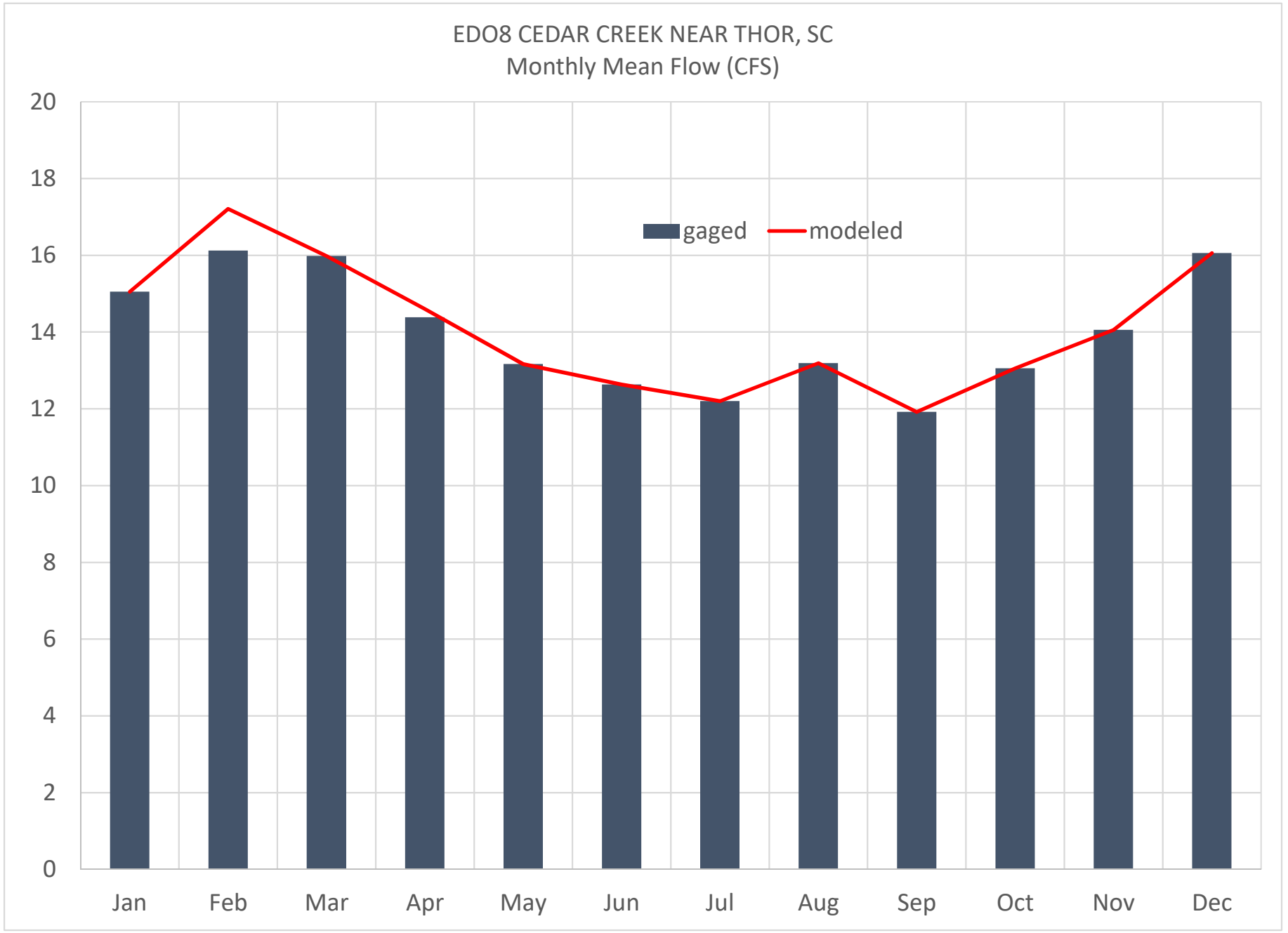

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC (CFS)
Annual Average Flow
gaged
modeled
1,600
1,400
1,200
1,000
800
600
400
200
0
1983
1988
1993
1998
2003
2008
2013

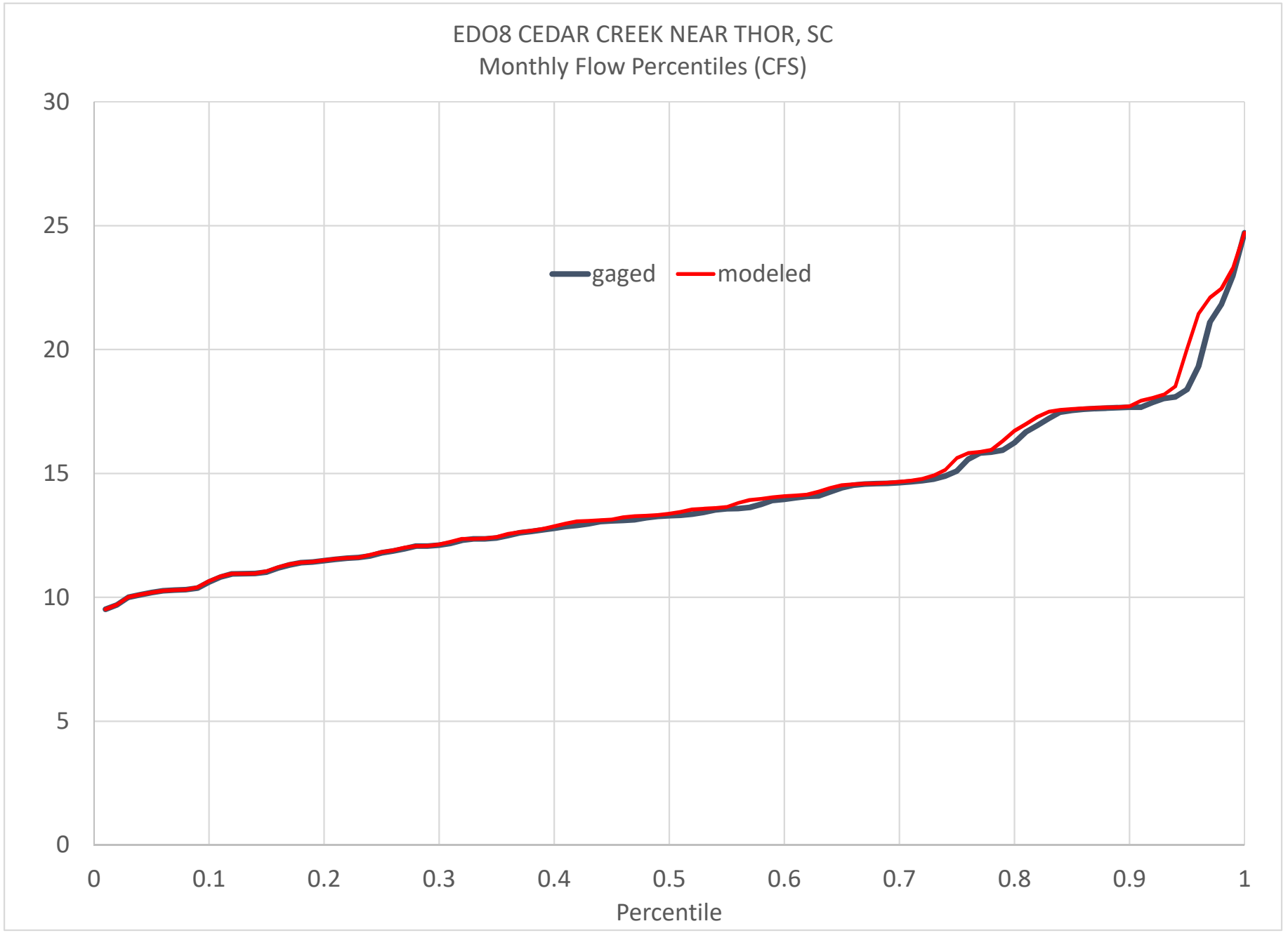

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC
Monthly Mean Flow (CFS)
1,400
1,200
1,000
800
600
400
200
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

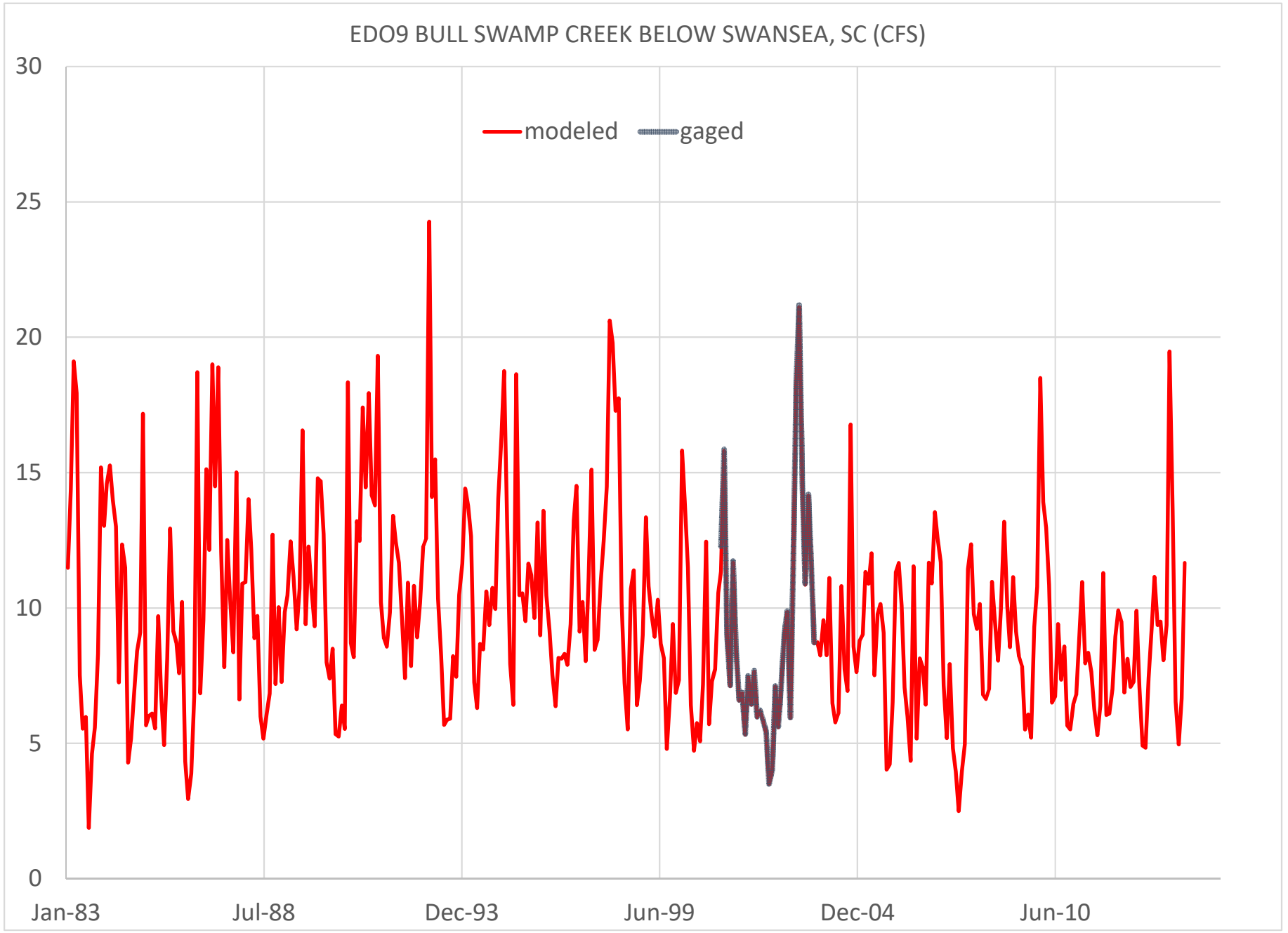

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC
Monthly Flow Percentiles (CFS)
3500
3000
2500
2000
1500
1000
500
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

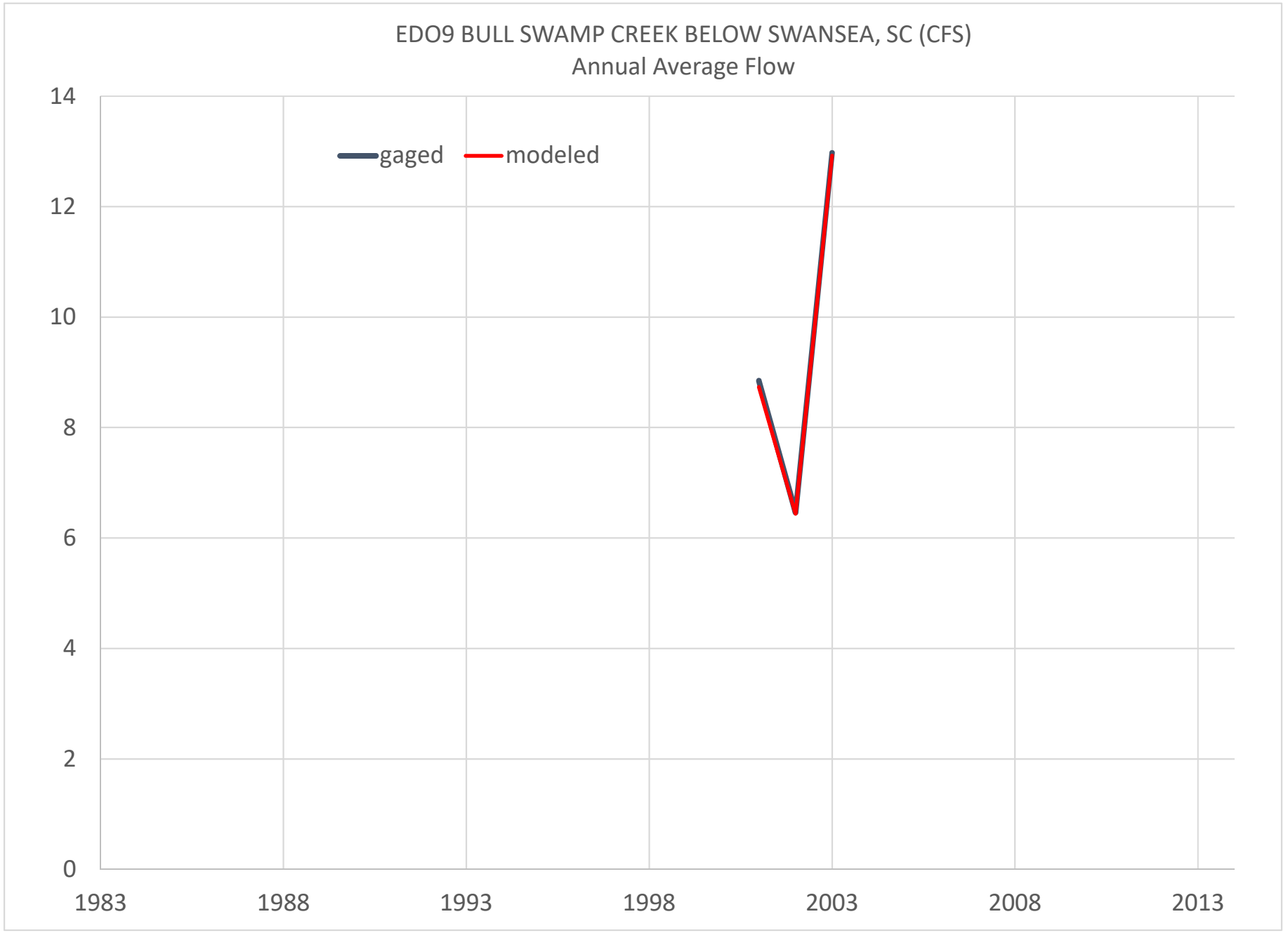

EDO8 CEDAR CREEK NEAR THOR, SC (CFS)
modeled
gaged
40
35
30
25
20
15
10
5
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

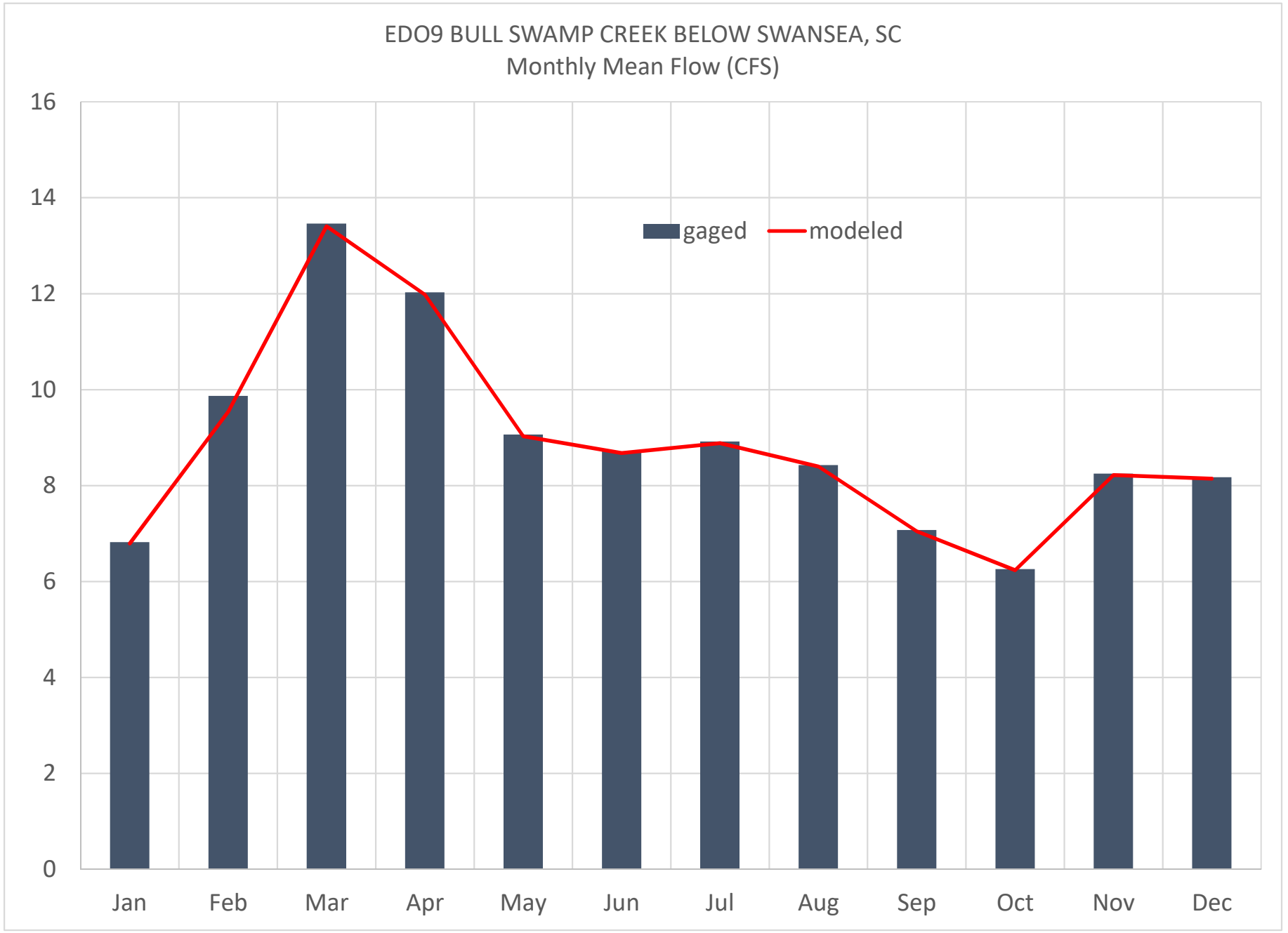

EDO8 CEDAR CREEK NEAR THOR, SC (CFS)
Annual Average Flow
gaged
modeled
18
16
14
12
10
8
6
4
2
0
1983
1988
1993
1998
2003
2008
2013

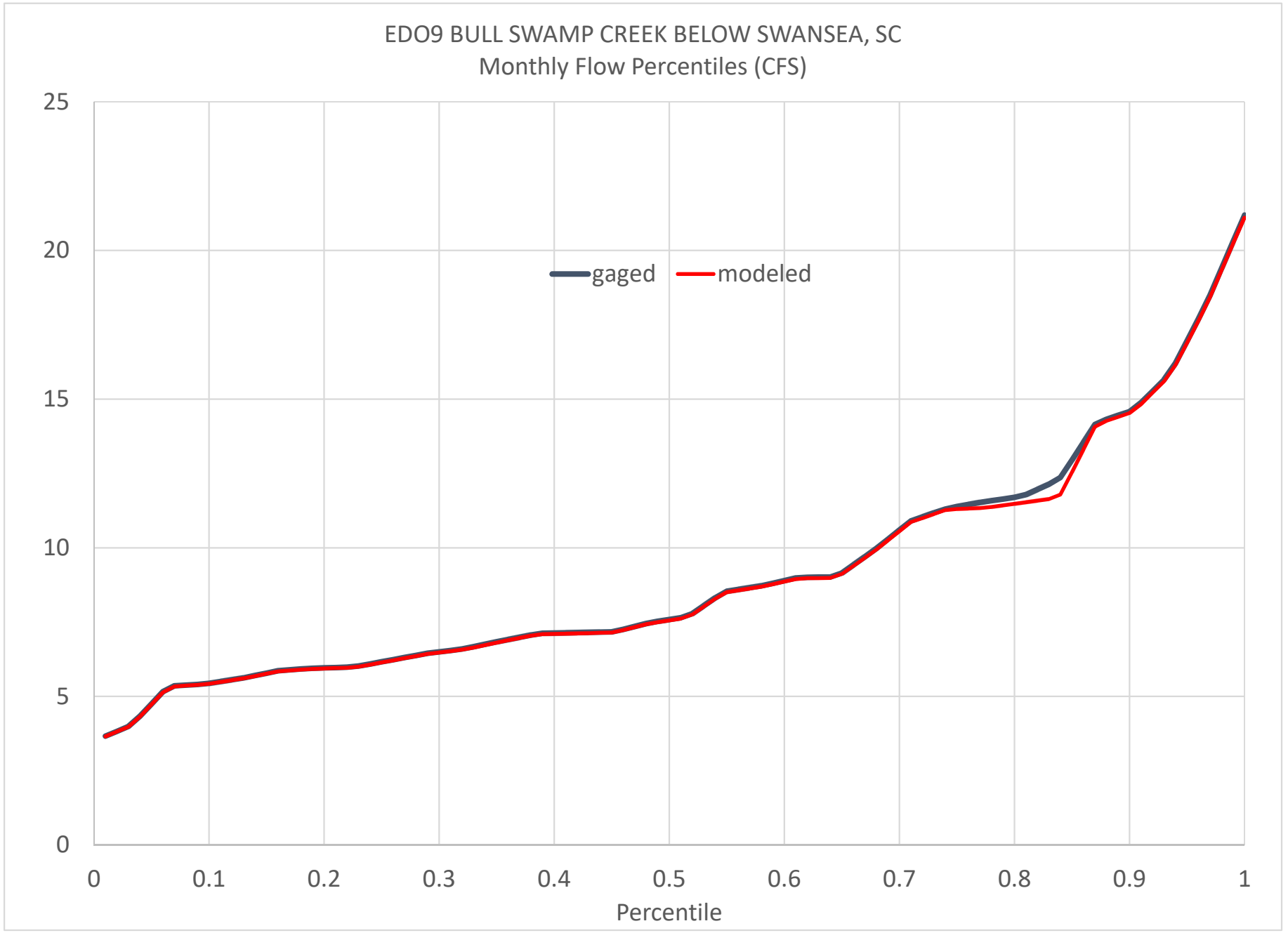

EDO8 CEDAR CREEK NEAR THOR, SC
Monthly Mean Flow (CFS)
gaged
modeled
20
18
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

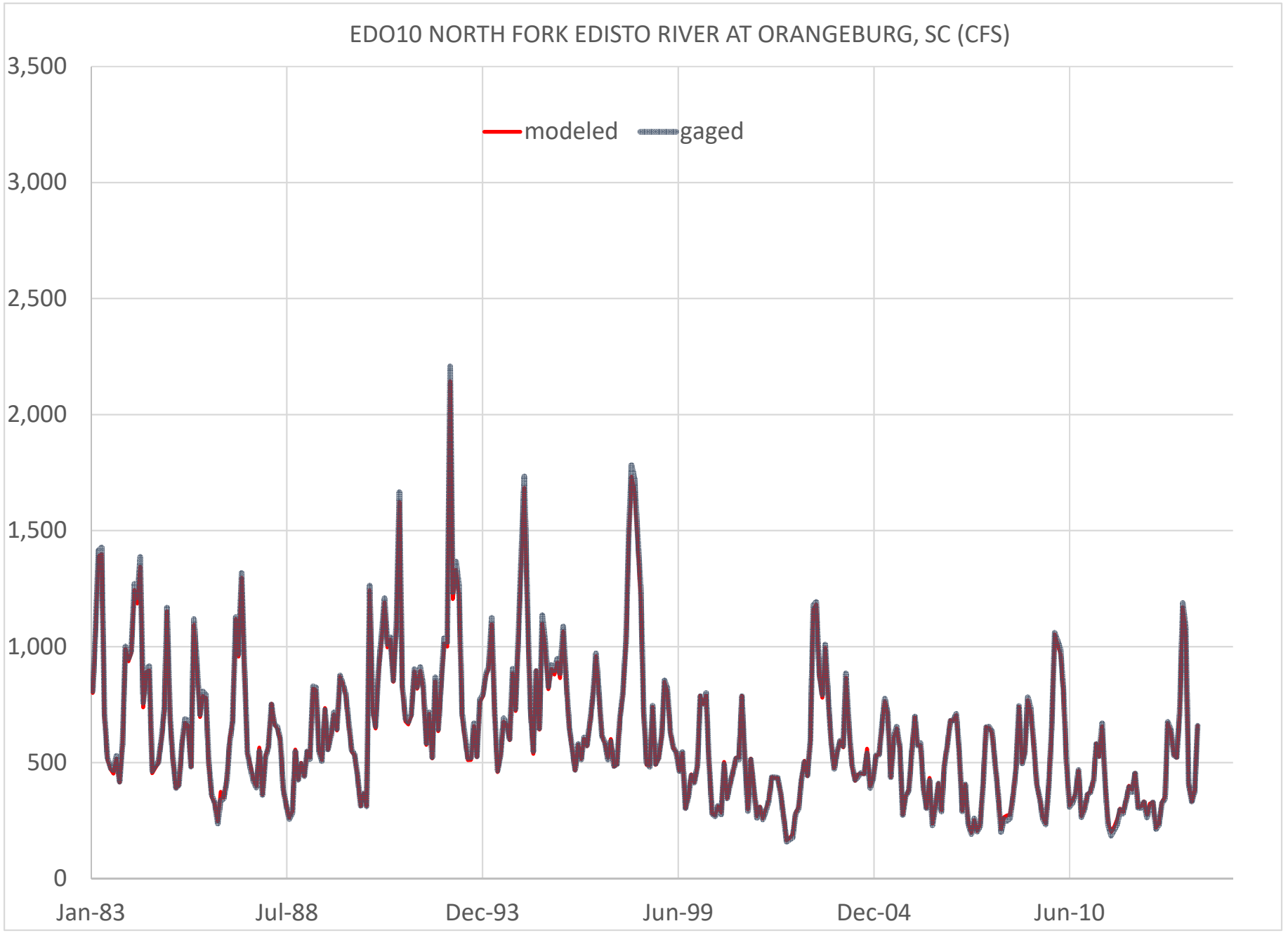

EDO8 CEDAR CREEK NEAR THOR, SC
Monthly Flow Percentiles (CFS)
30
25
20
15
10
5
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

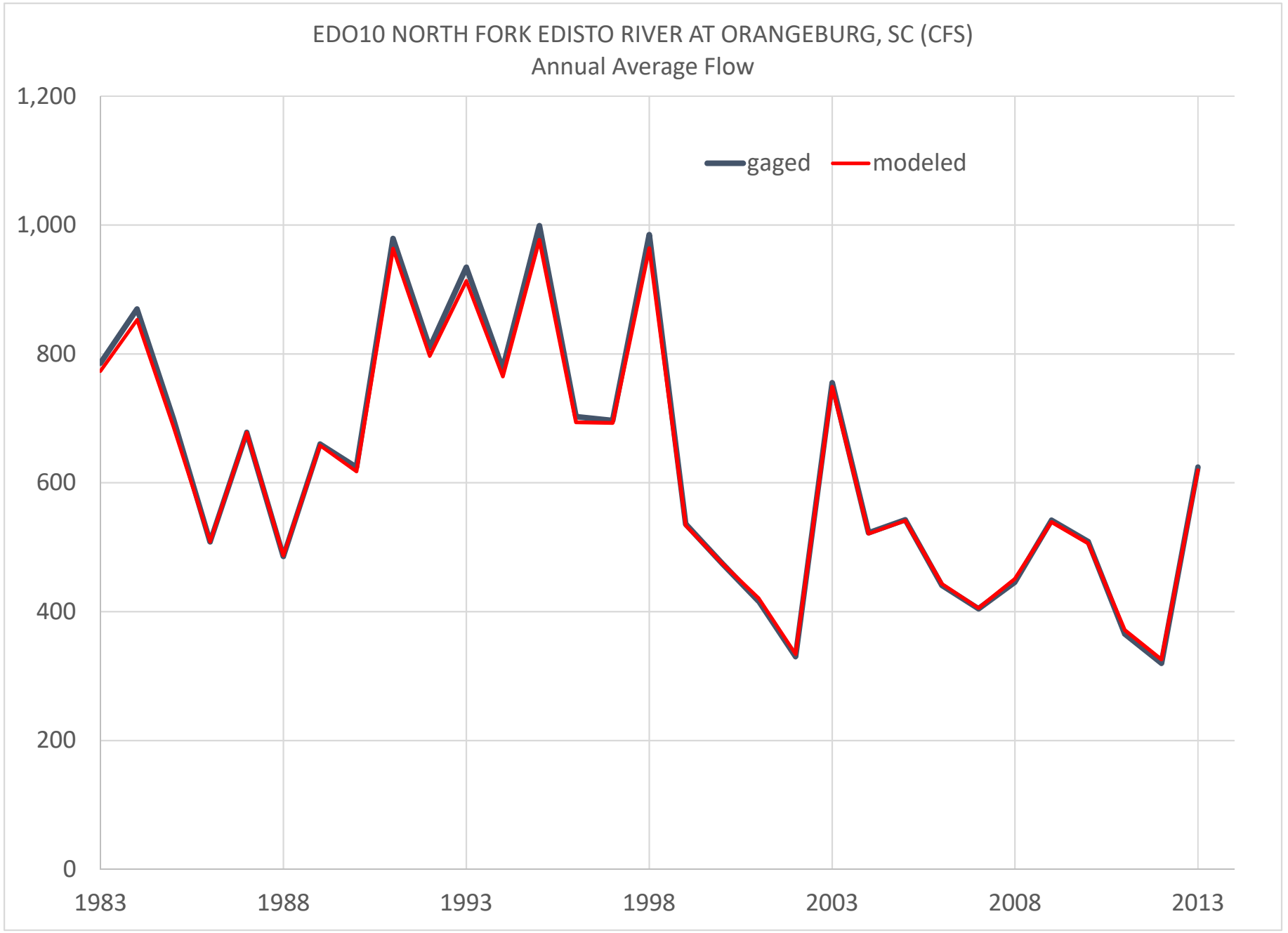

EDO9 BULL SWAMP CREEK BELOW SWANSEA, SC (CFS)
modeled
gaged
30
25
20
15
10
5
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

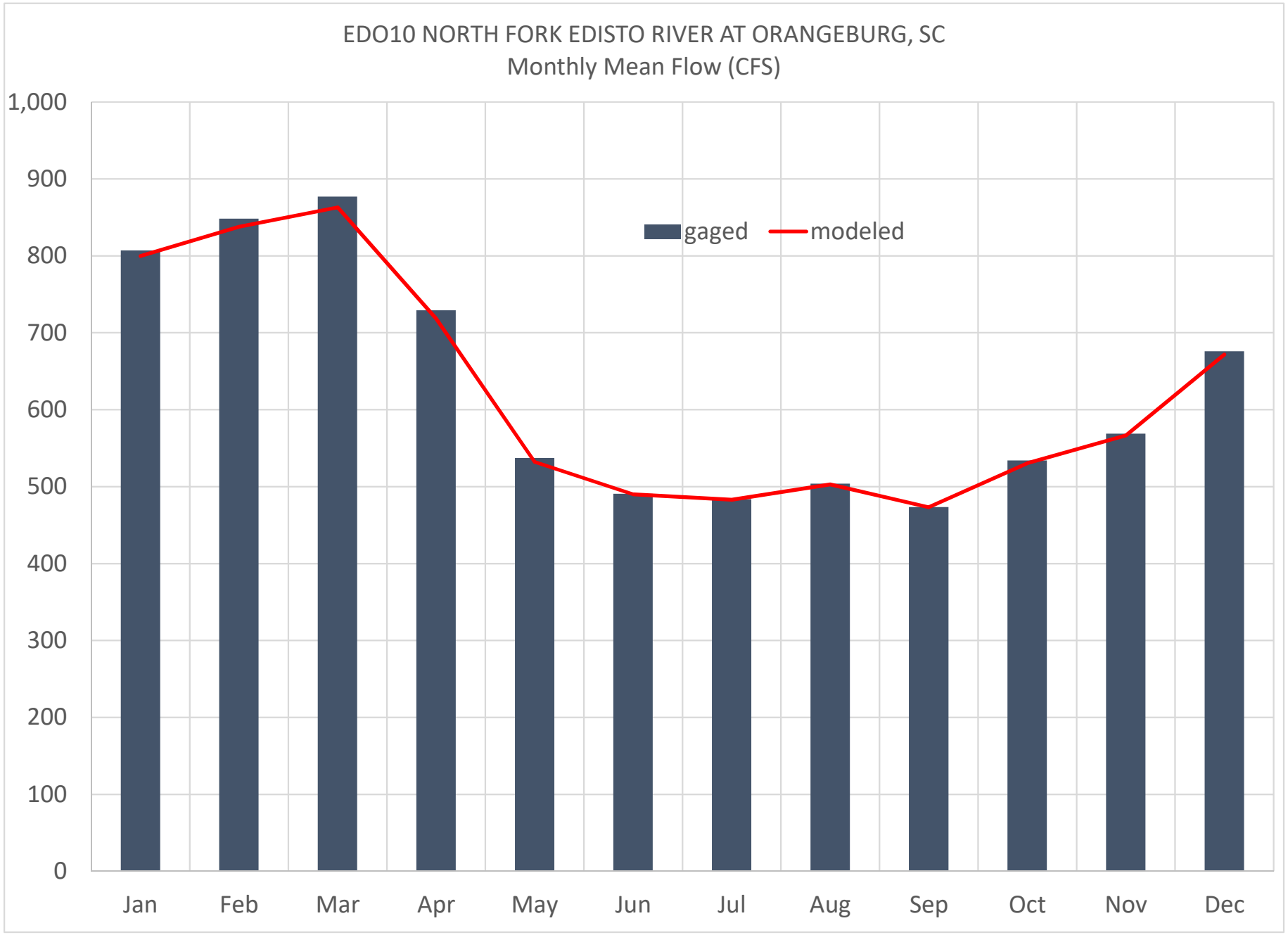

EDO9 BULL SWAMP CREEK BELOW SWANSEA, SC (CFS)
Annual Average Flow
gaged
modeled
14
12
10
8
6
4
2
0
1983
1988
1993
1998
2003
2008
2013

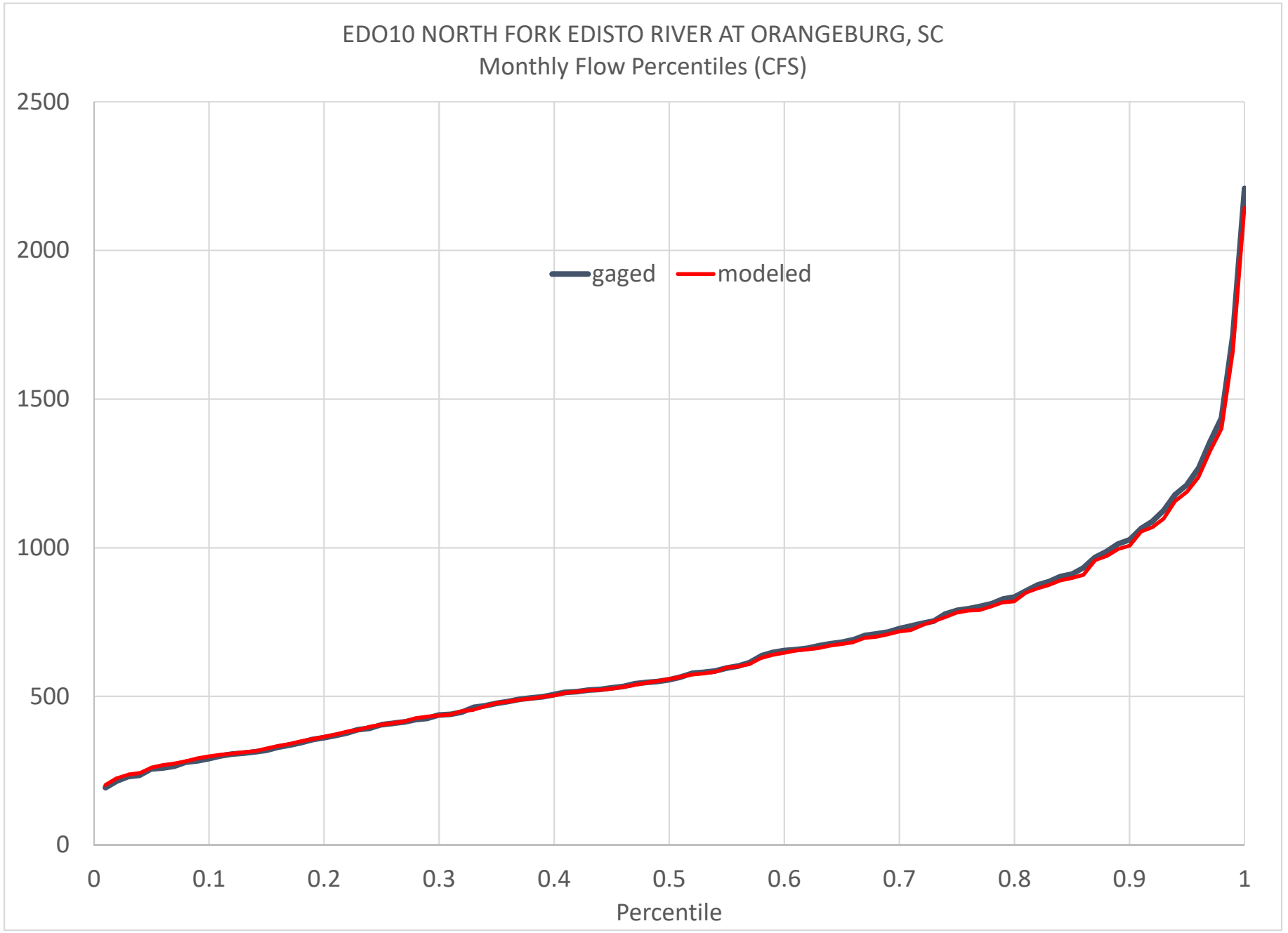

EDO9 BULL SWAMP CREEK BELOW SWANSEA, SC
Monthly Mean Flow (CFS)
16
14
12
10
8
6
4
2
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

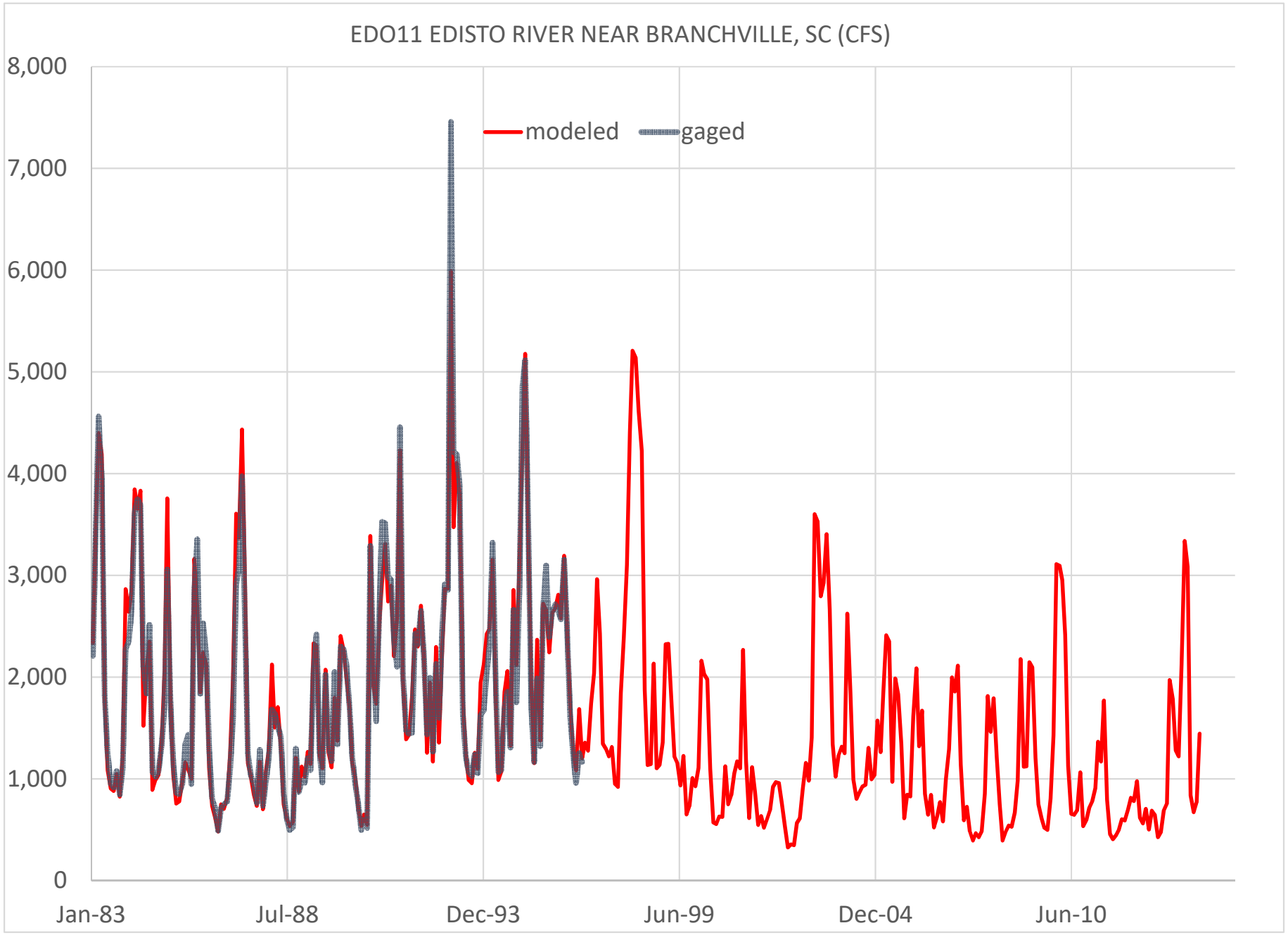

EDO9 BULL SWAMP CREEK BELOW SWANSEA, SC
Monthly Flow Percentiles (CFS)
25
20
15
10
5
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

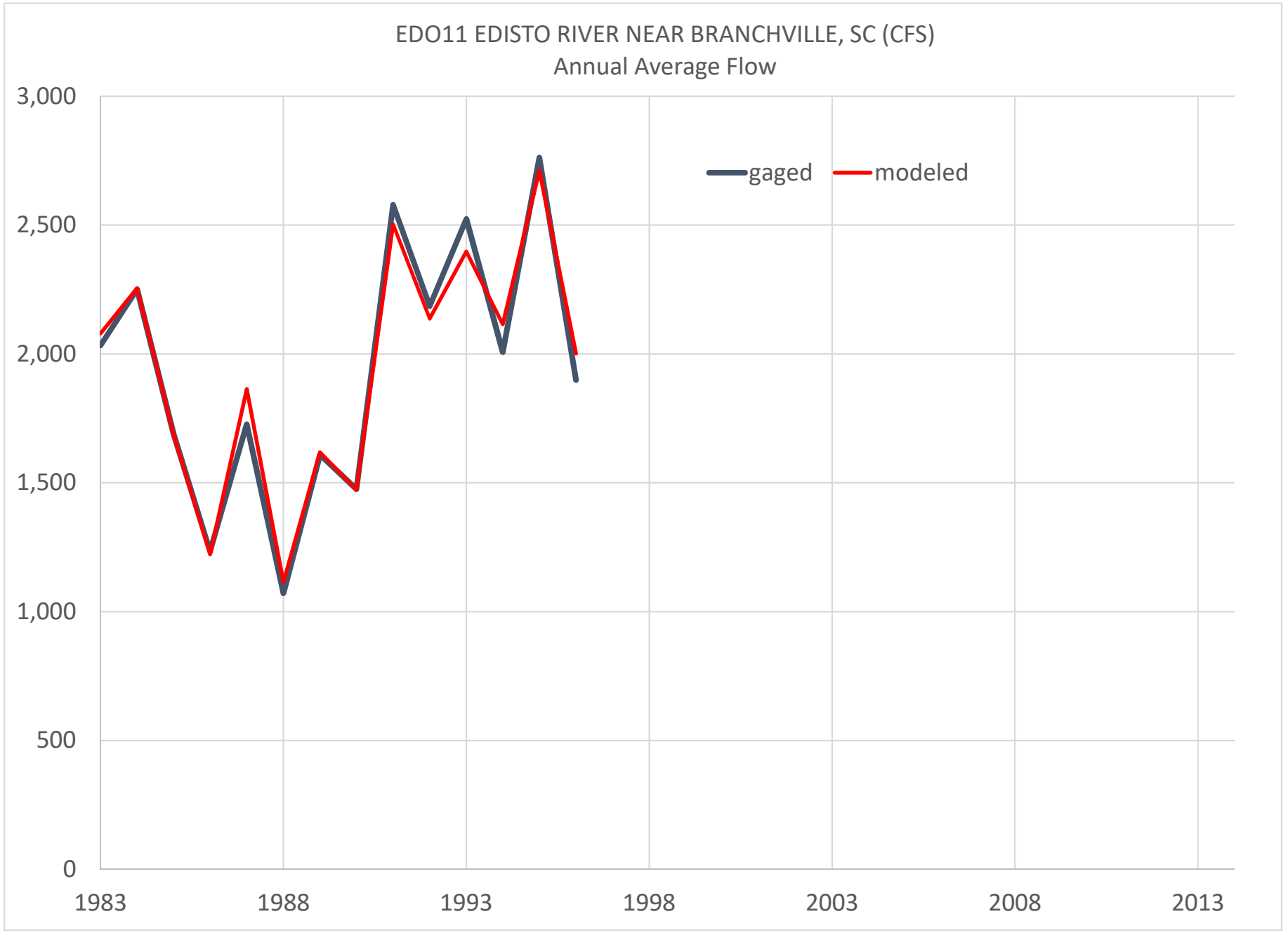

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC (CFS)
modeled
gaged
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

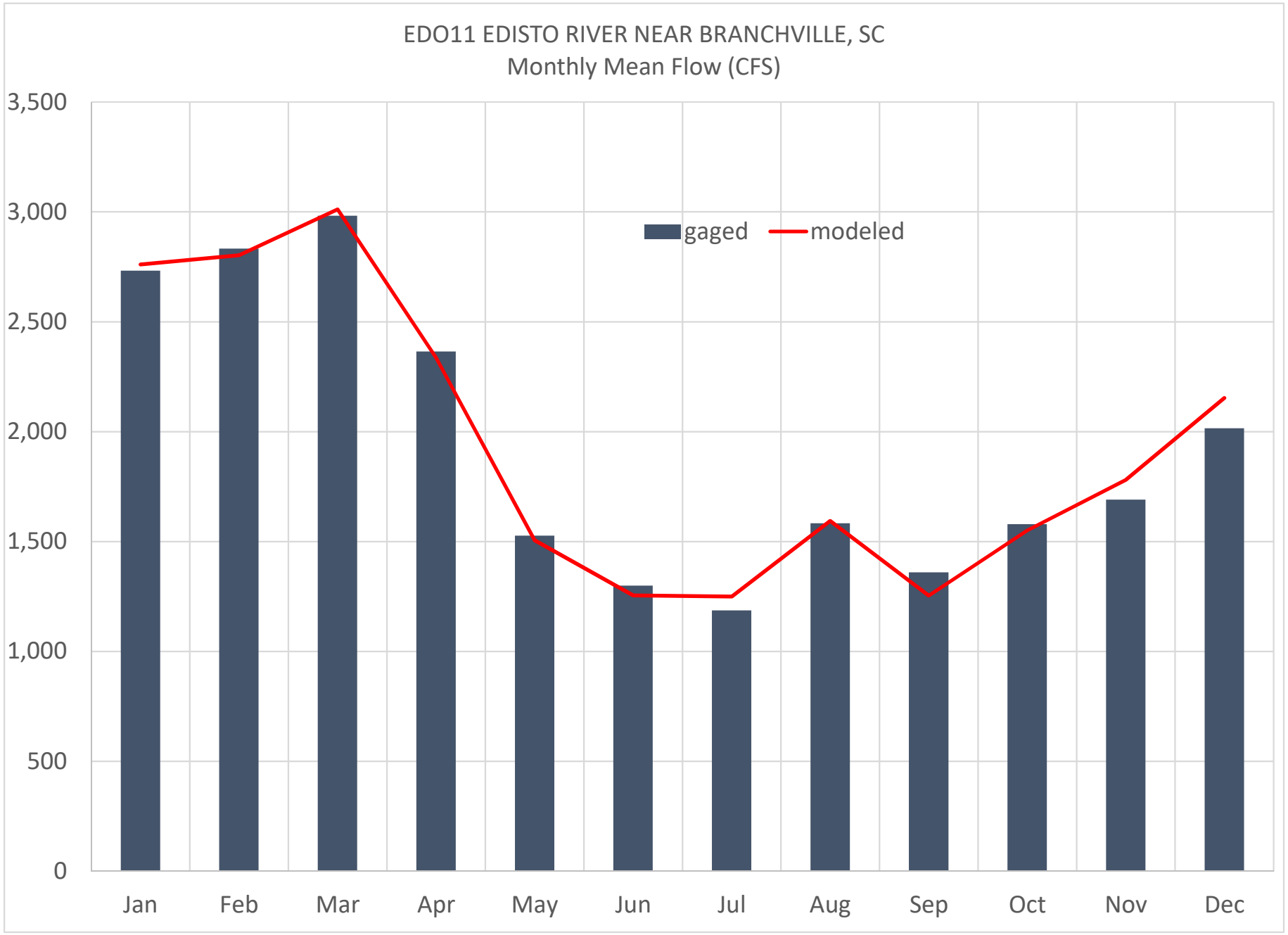

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC (CFS)
Annual Average Flow
gaged
modeled
1,200
1,000
800
600
400
200
0
1983
1988
1993
1998
2003
2008
2013

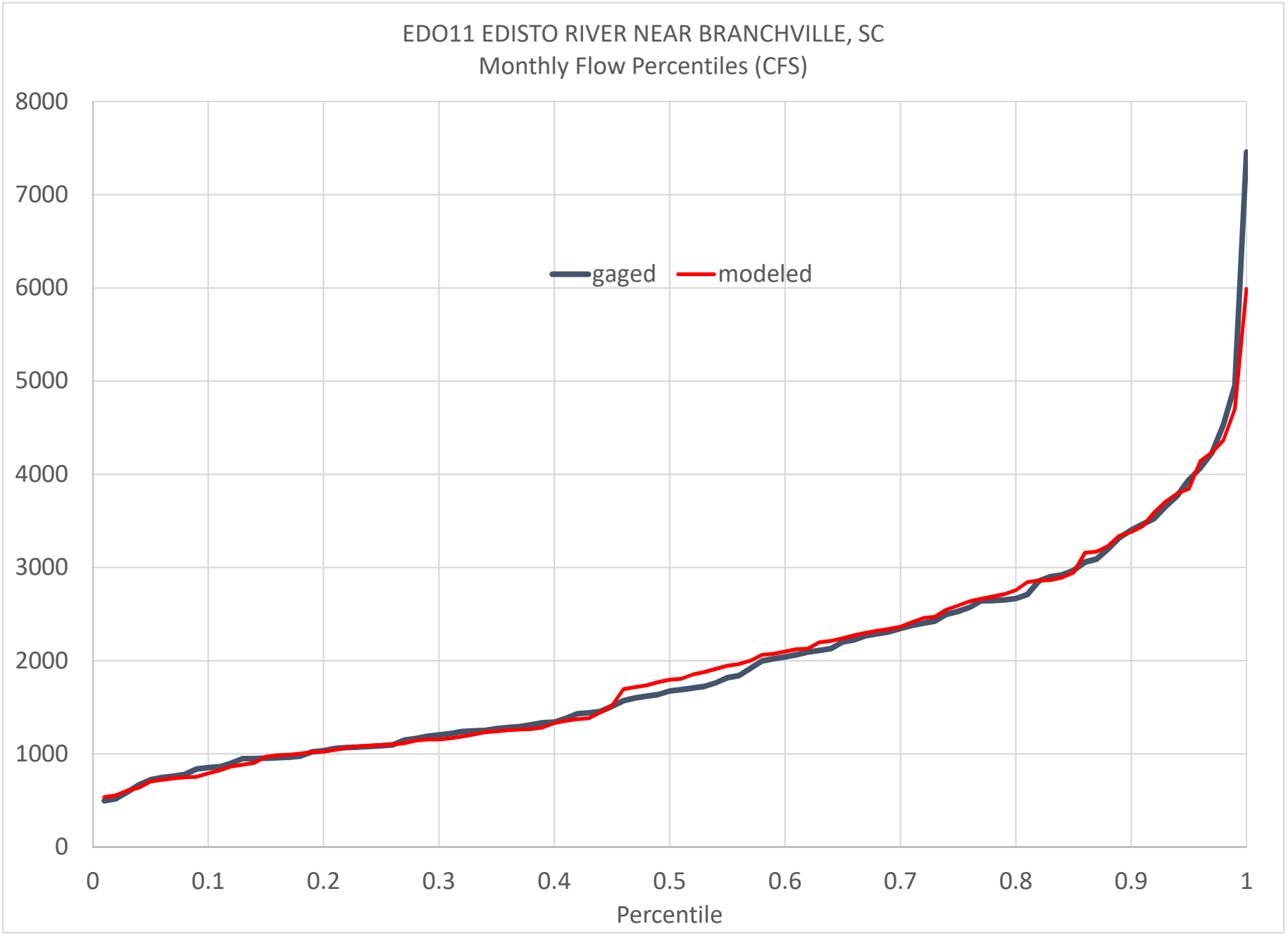

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC
Monthly Mean Flow (CFS)
1,000
900
800
700
600
500
400
300
200
100
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

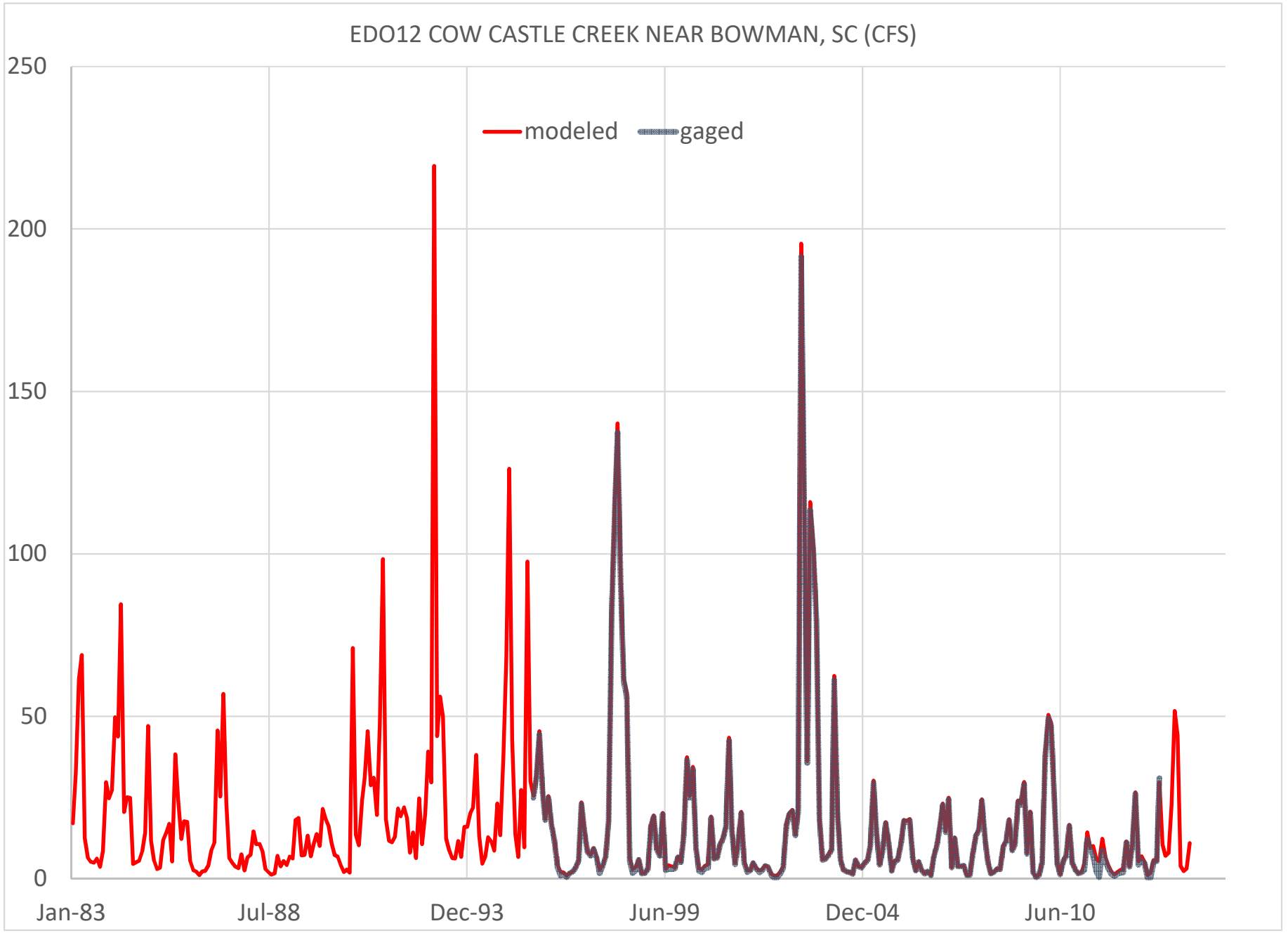

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC
Monthly Flow Percentiles (CFS)
2500
2000
1500
1000
500
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

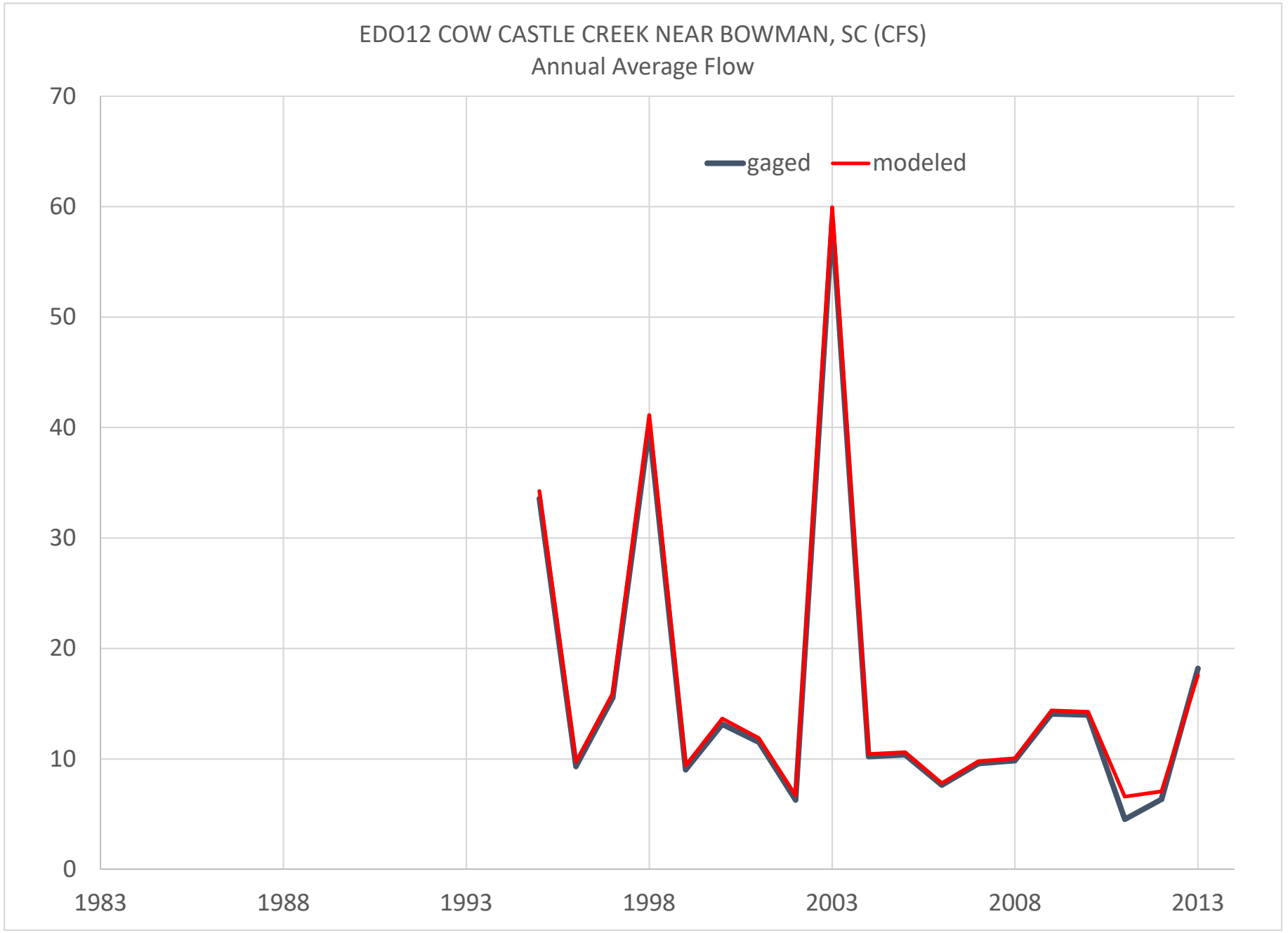

EDO11 EDISTO RIVER NEAR BRANCHVILLE, SC (CFS)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

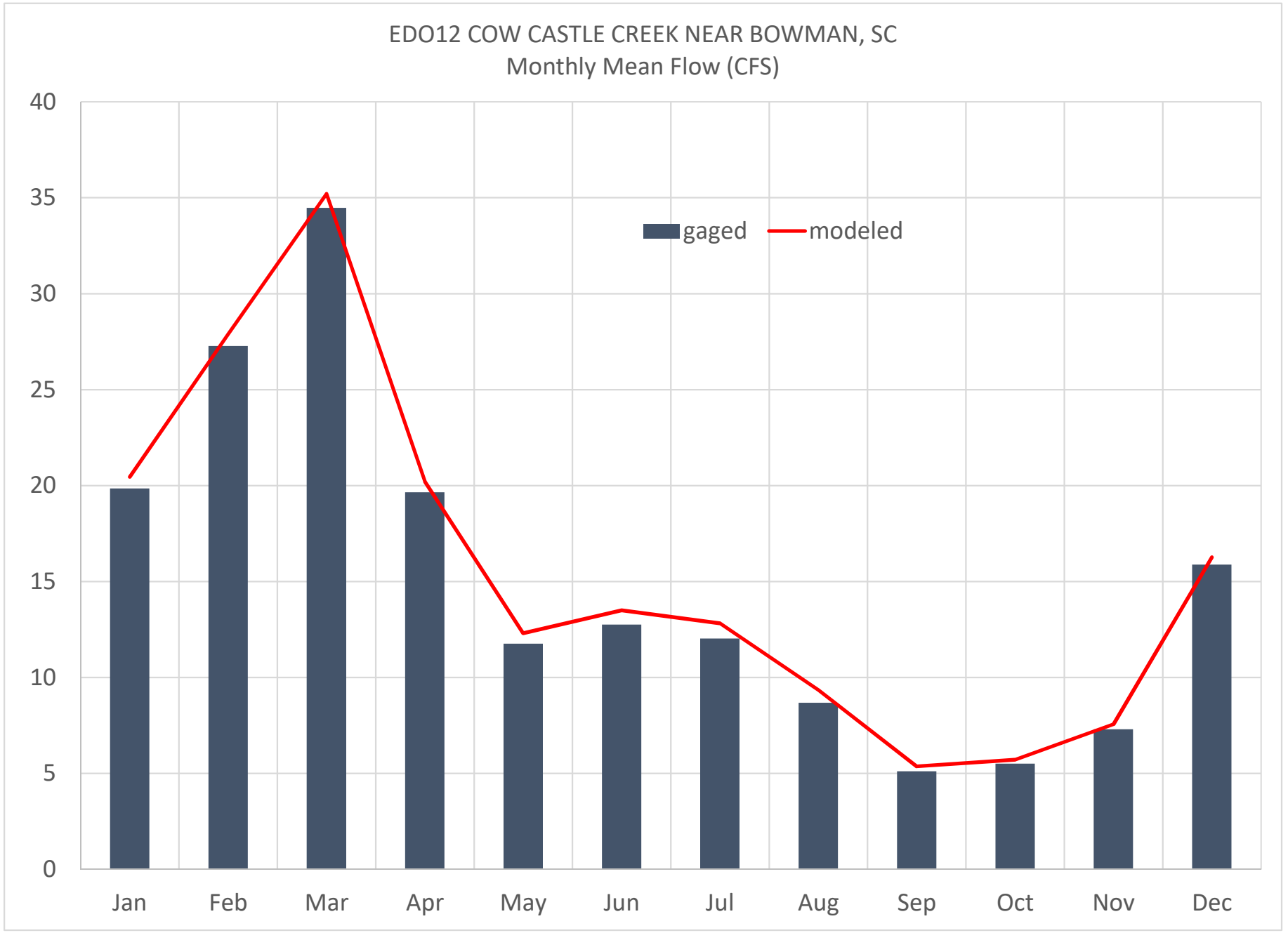

EDO11 EDISTO RIVER NEAR BRANCHVILLE, SC (CFS)
Annual Average Flow
gaged
modeled
3,000
2,500
2,000
1,500
1,000
500
0
1983
1988
1993
1998
2003
2008
2013

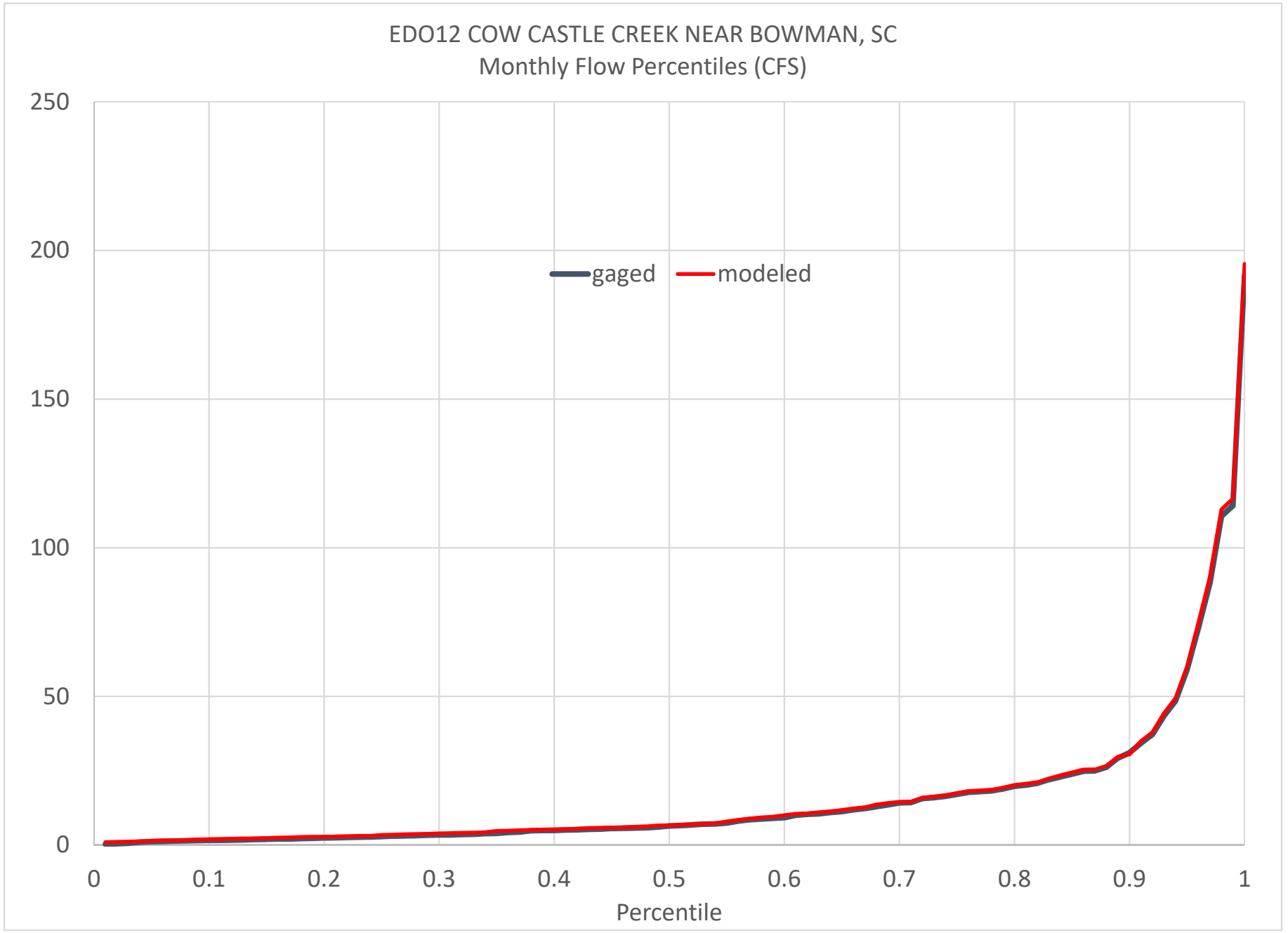

EDO11 EDISTO RIVER NEAR BRANCHVILLE, SC
Monthly Mean Flow (CFS)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

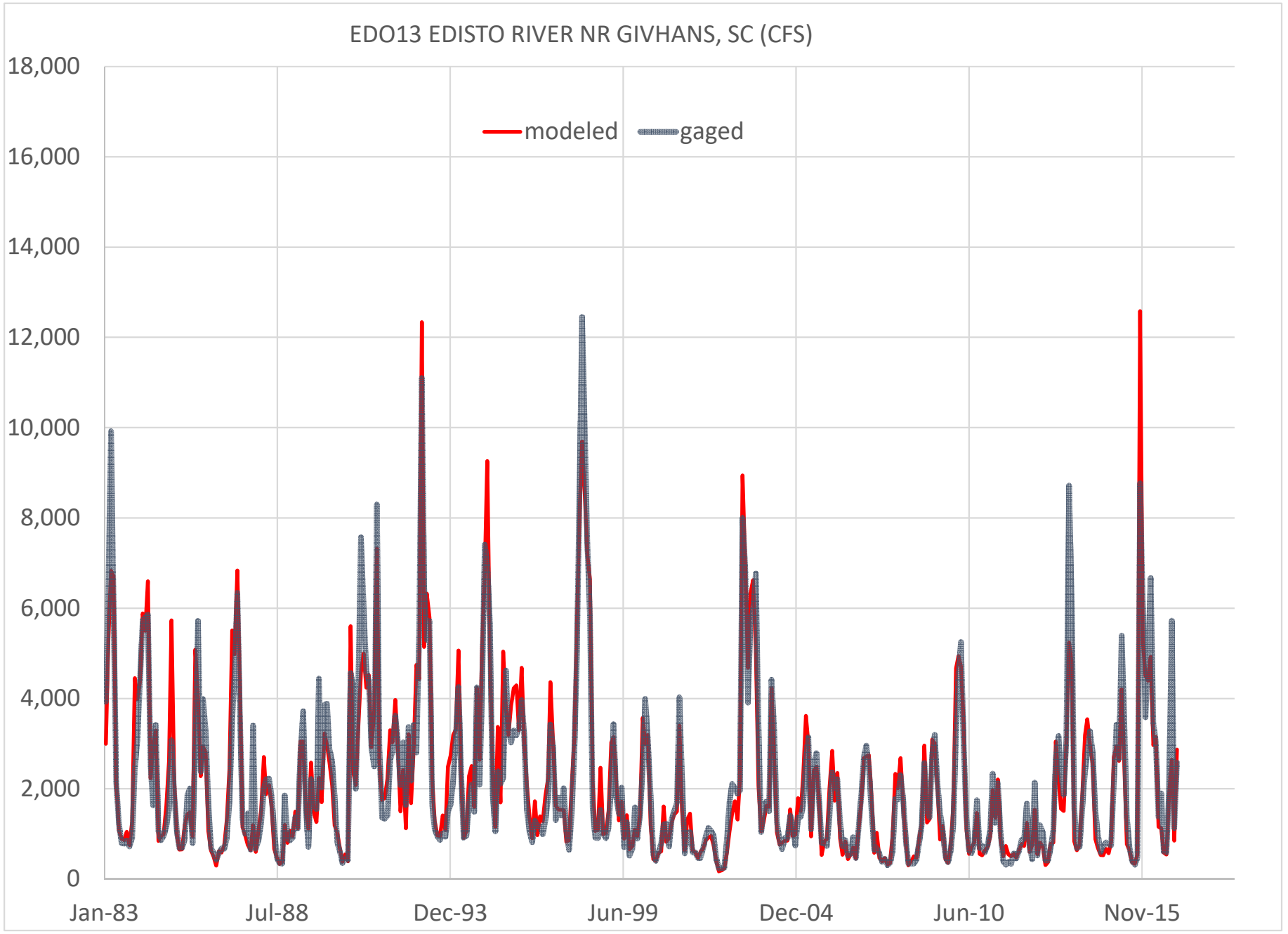

EDO11 EDISTO RIVER NEAR BRANCHVILLE, SC
Monthly Flow Percentiles (CFS)
8000
7000
6000
5000
4000
3000
2000
1000
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

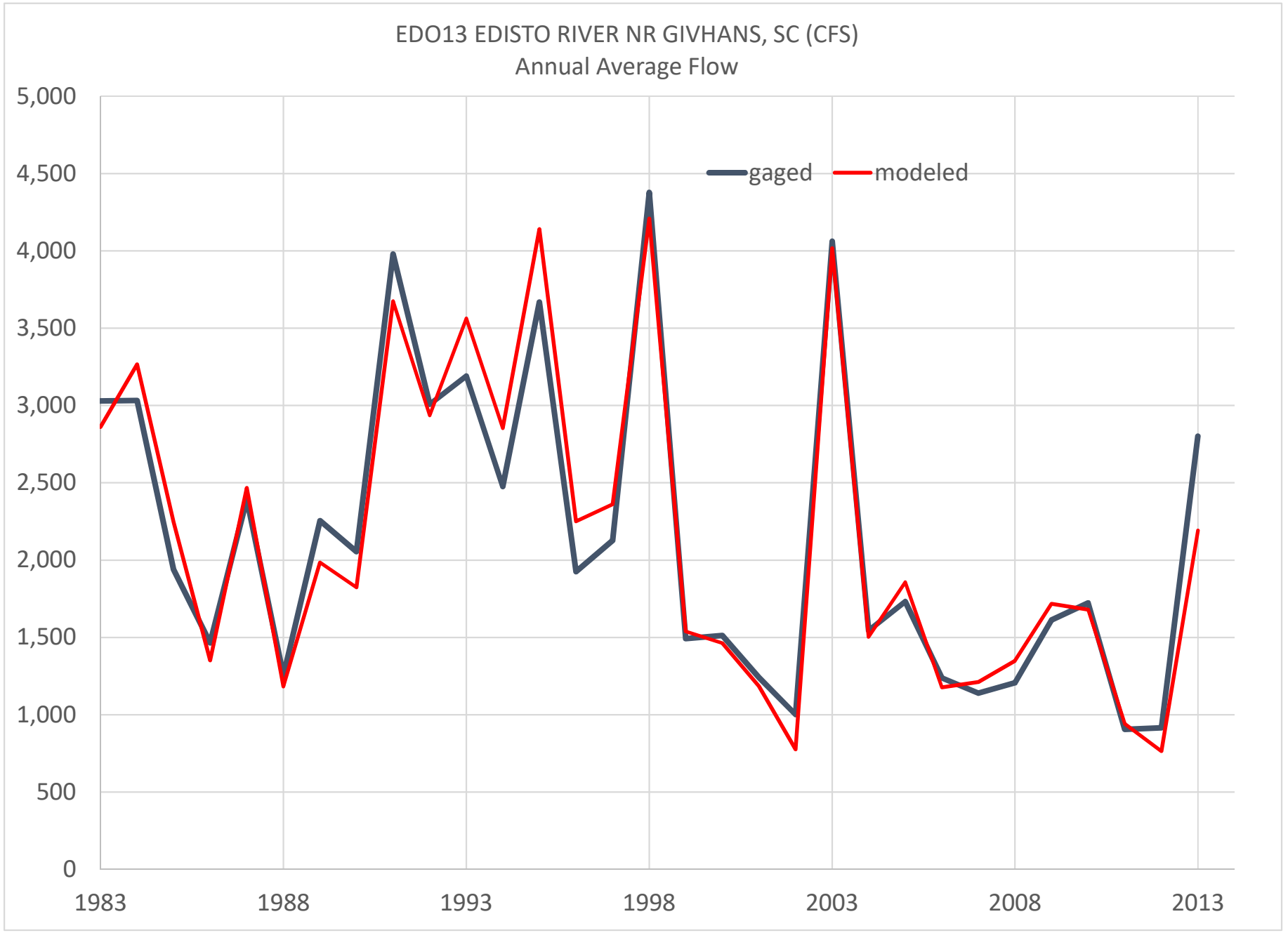

EDO12 COW CASTLE CREEK NEAR BOWMAN, SC (CFS)
250
200
150
100
50
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

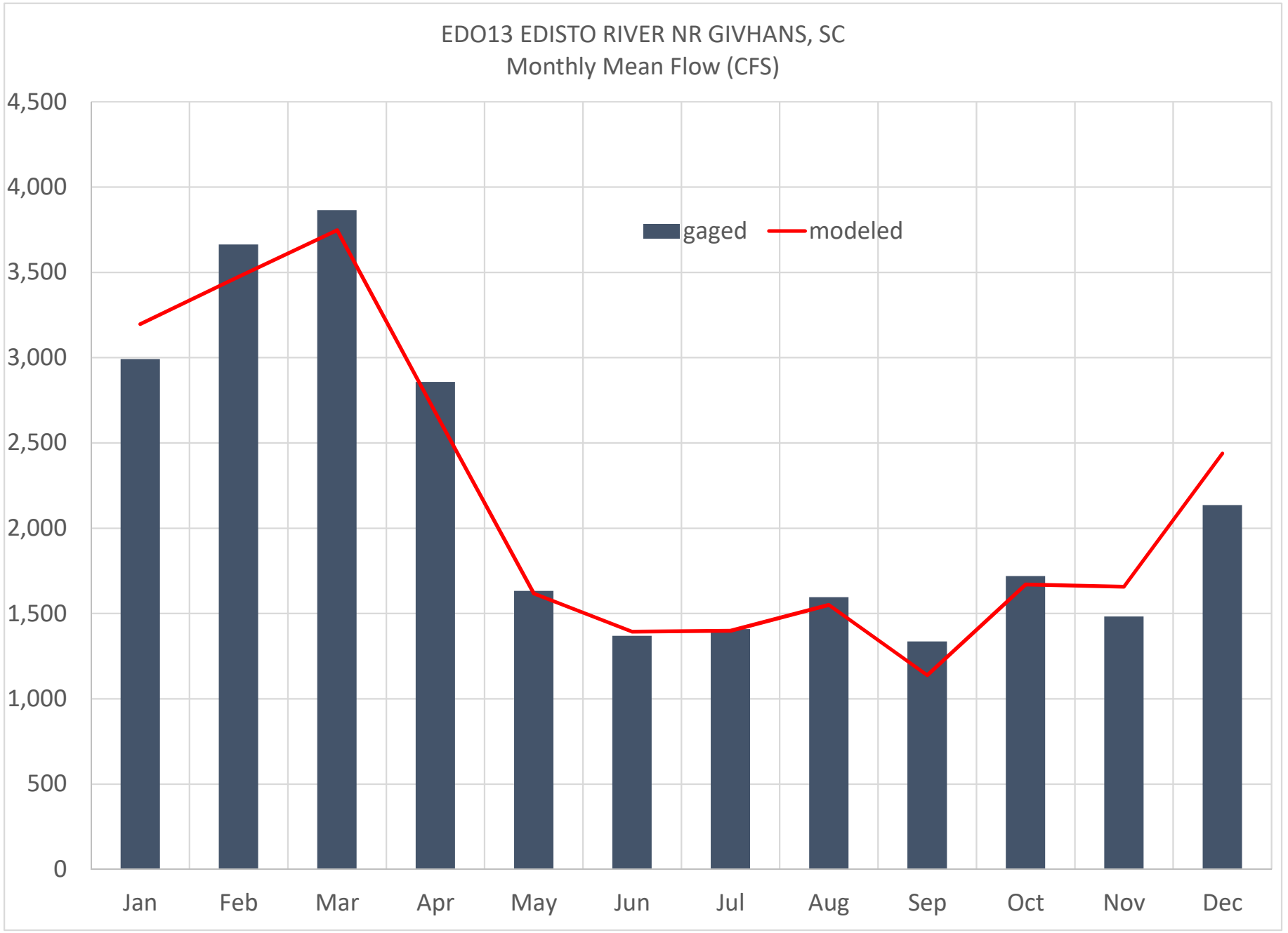

EDO12 COW CASTLE CREEK NEAR BOWMAN, SC (CFS)
Annual Average Flow
gaged
modeled
70
60
50
40
30
20
10
0
1983
1988
1993
1998
2003
2008
2013

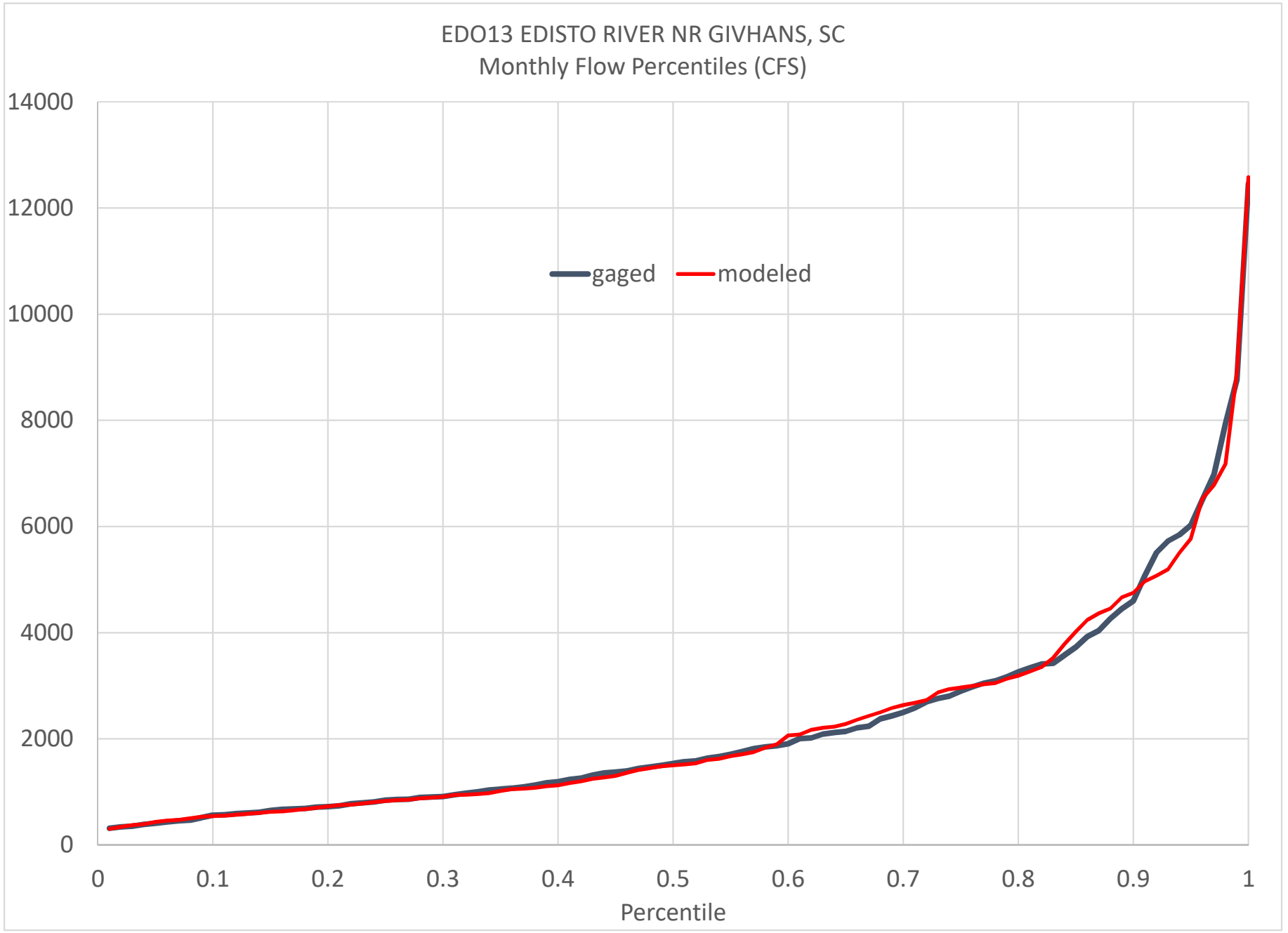

EDO12 COW CASTLE CREEK NEAR BOWMAN, SC
Monthly Mean Flow (CFS)
40
35
30
25
20
15
10
5
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

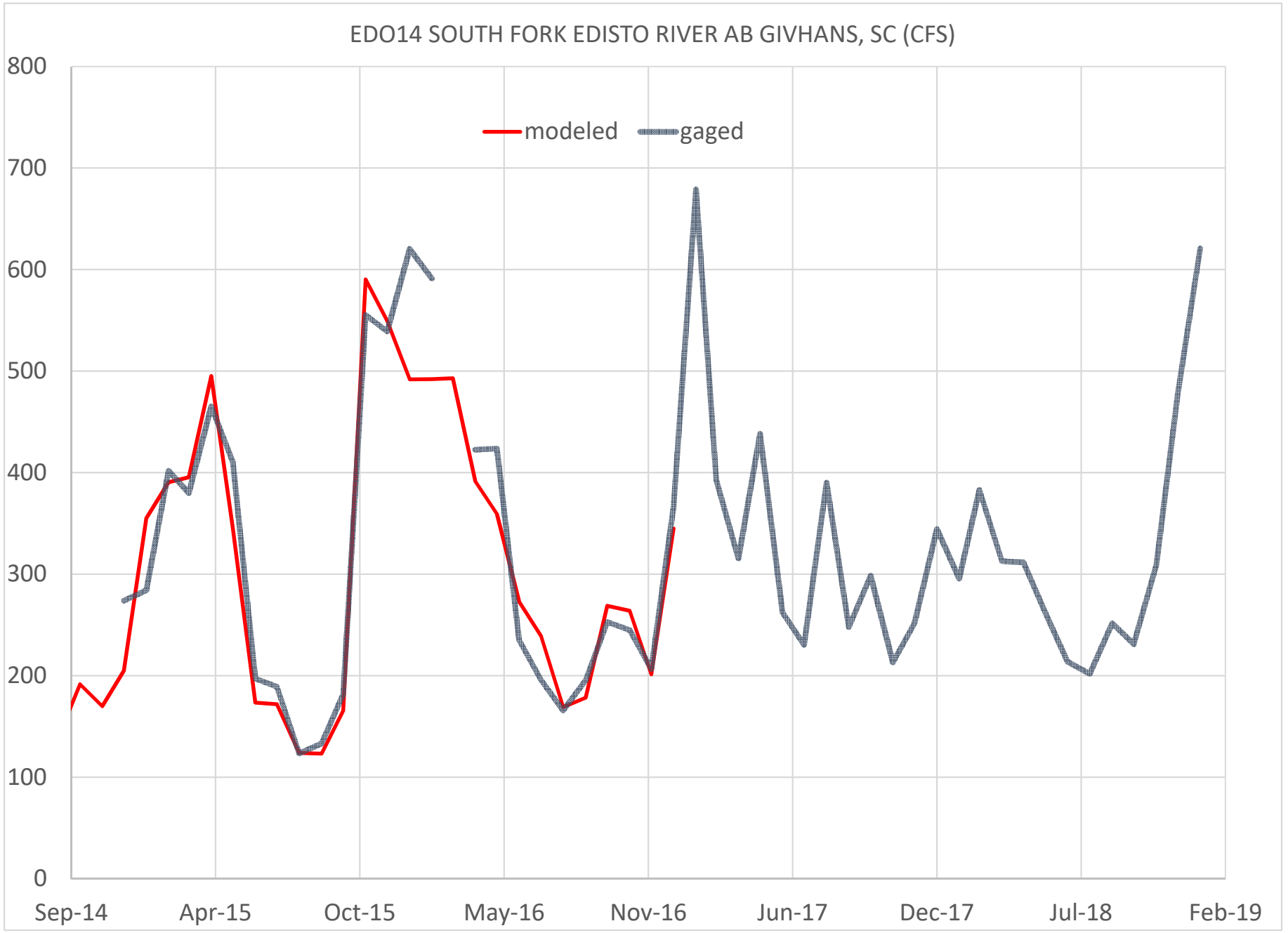

EDO12 COW CASTLE CREEK NEAR BOWMAN, SC
Monthly Flow Percentiles (CFS)
250
200
150
100
50
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile


EDO13 EDISTO RIVER NR GIVHANS, SC (CFS)
modeled
gaged
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10
Nov-15


EDO13 EDISTO RIVER NR GIVHANS, SC (CFS)
Annual Average Flow
gaged
modeled
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1983
1988
1993
1998
2003
2008
2013

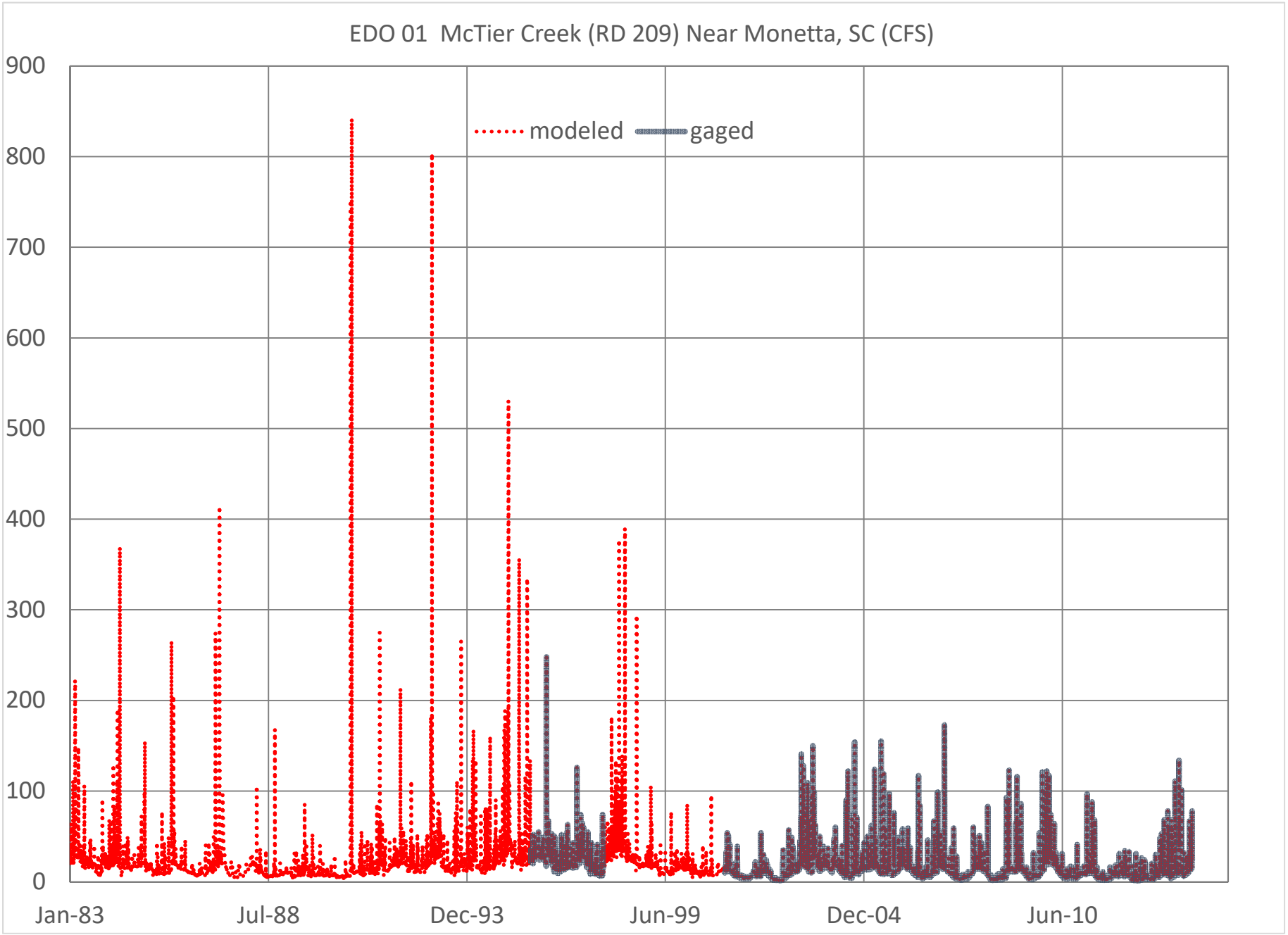

EDO13 EDISTO RIVER NR GIVHANS, SC
Monthly Mean Flow (CFS)
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

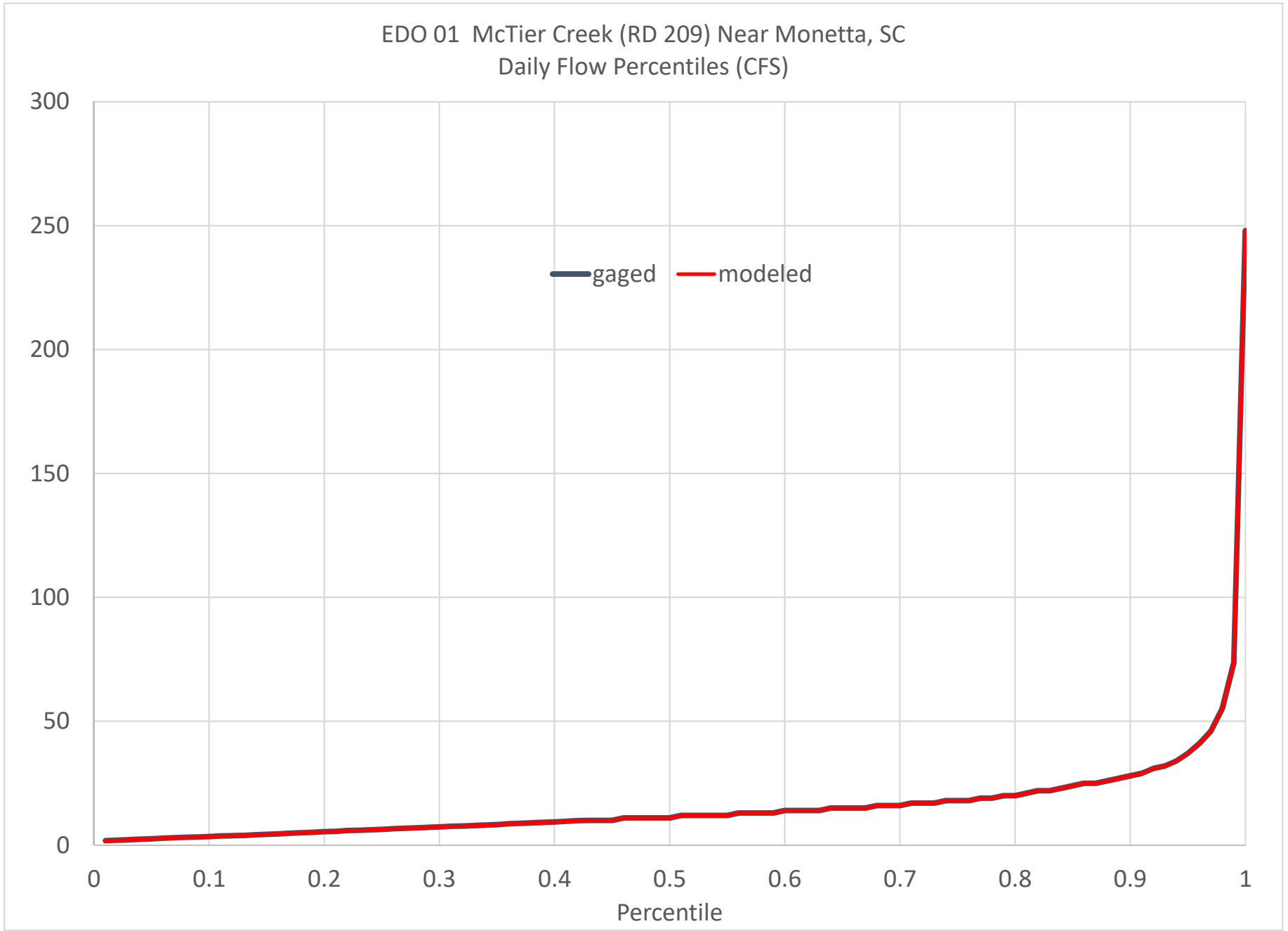

EDO13 EDISTO RIVER NR GIVHANS, SC
Monthly Flow Percentiles (CFS)
14000
12000
10000
8000
6000
4000
2000
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

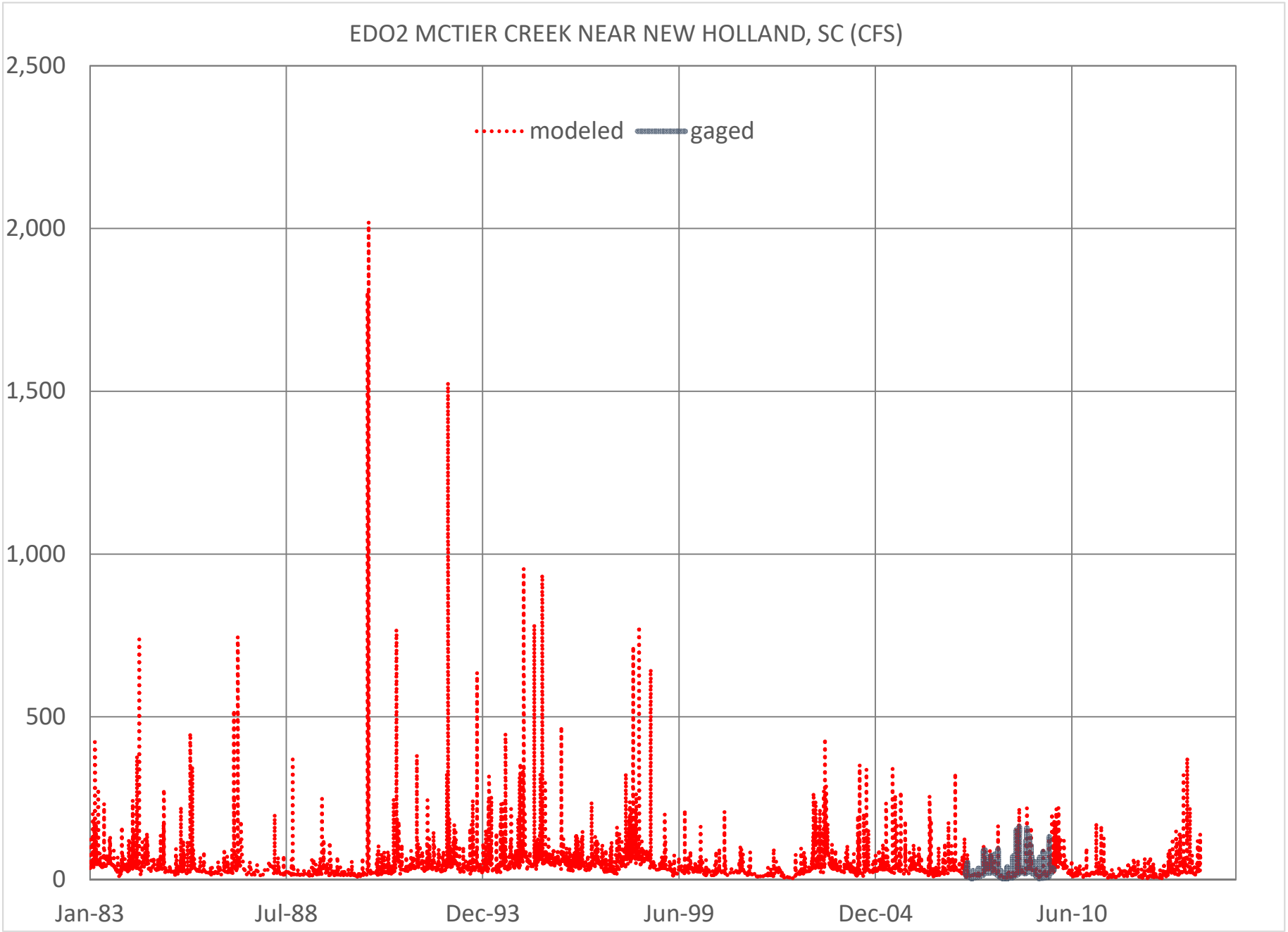

EDO14 SOUTH FORK EDISTO RIVER AB GIVHANS, SC (CFS)
modeled
gaged
800
700
600
500
400
300
200
100
0
Sep-14
Apr-15
Oct-15
May-16
Nov-16
Jun-17
Dec-17
Jul-18
Feb-19

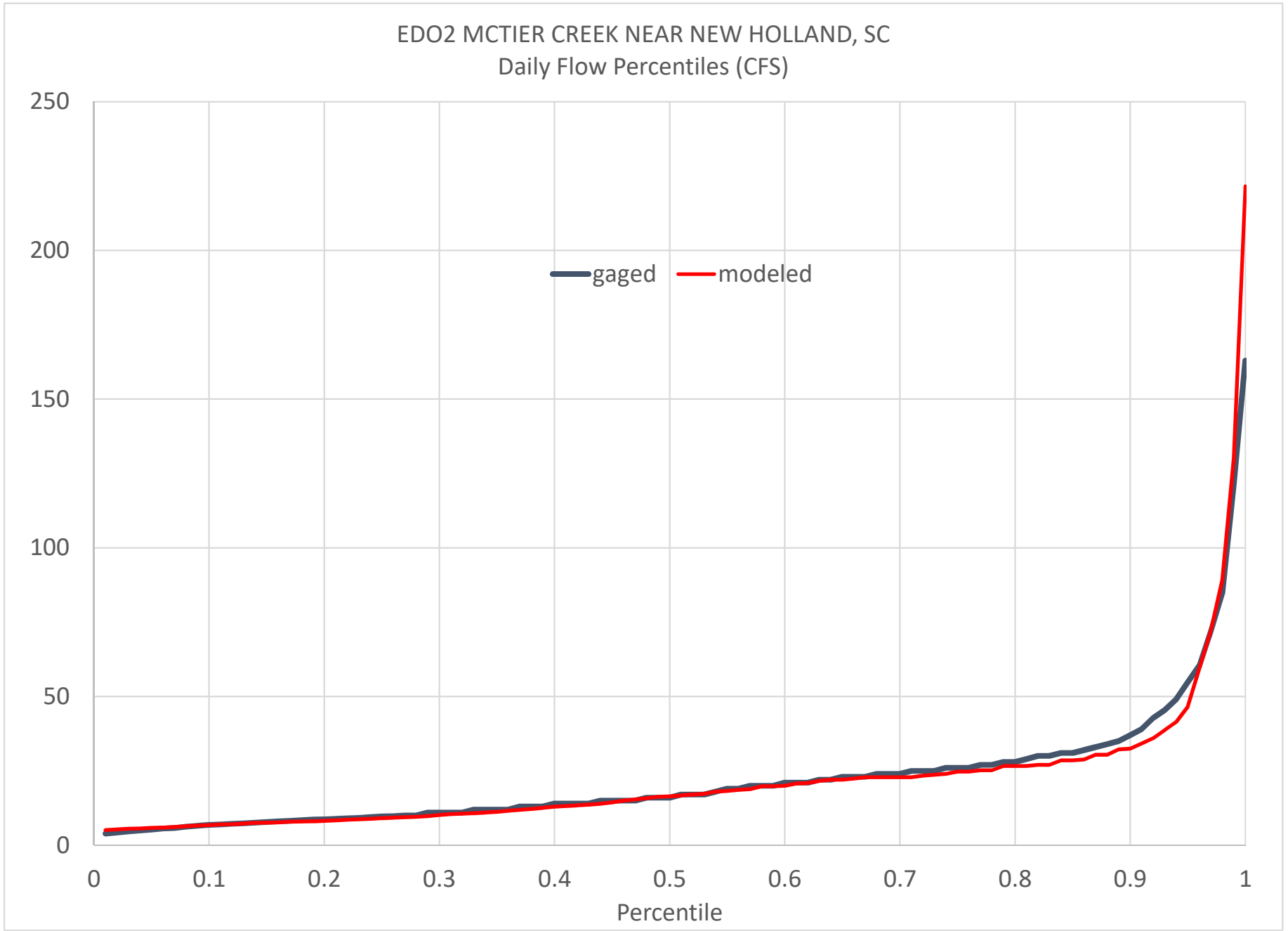
Attachment B

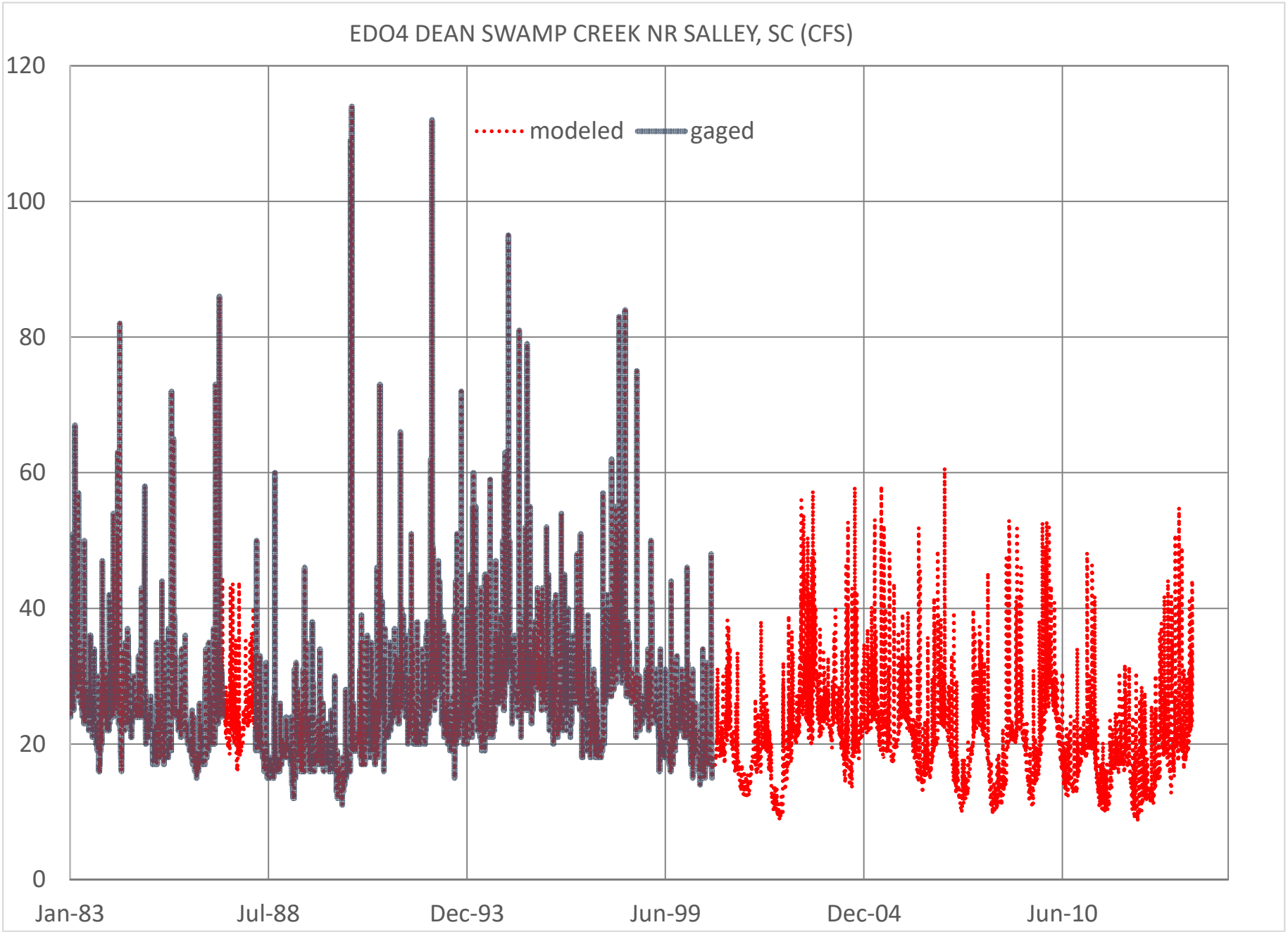
Daily Calibration Model Results

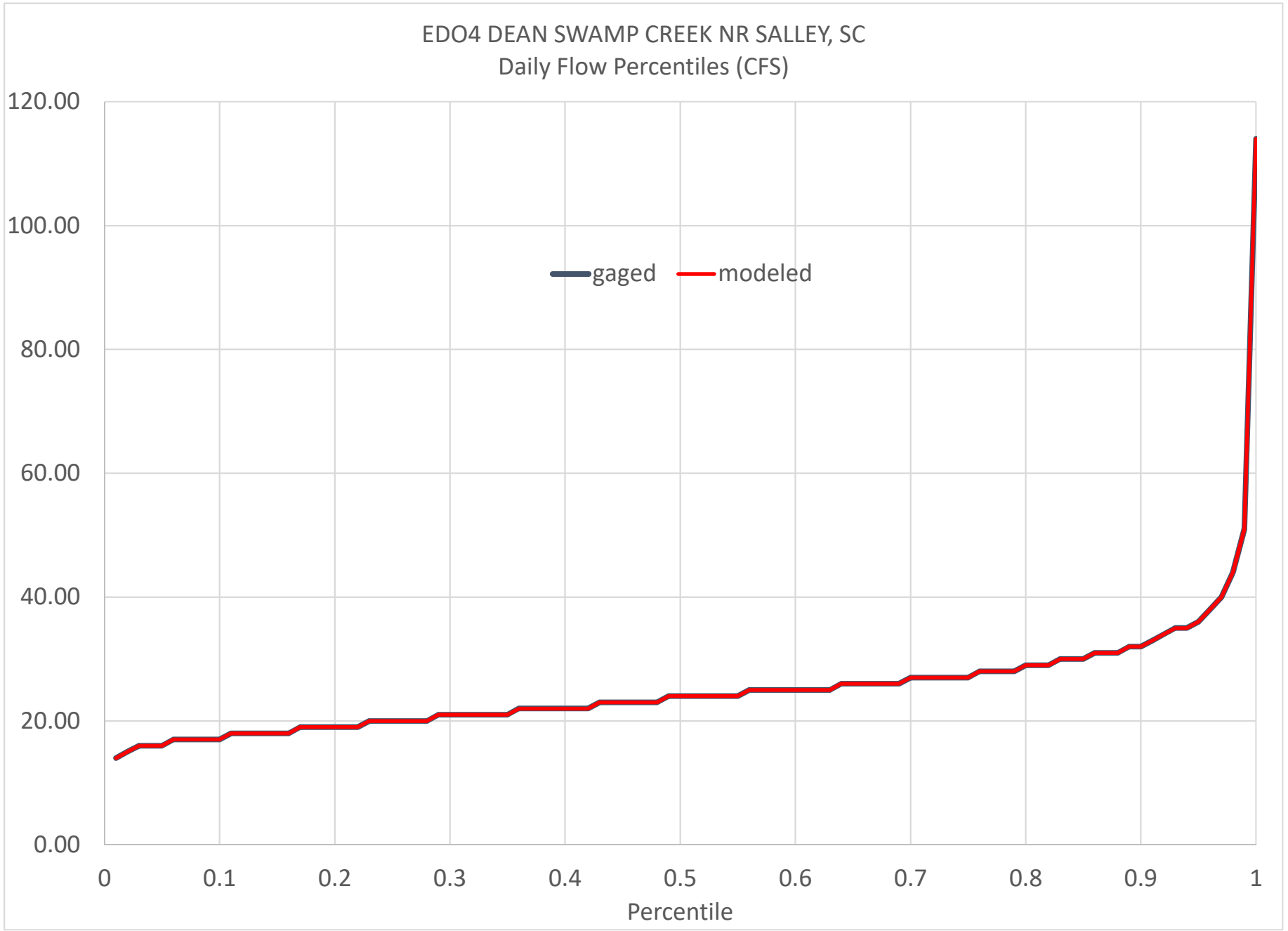

EDO 01 McTier Creek (RD 209) Near Monetta, SC (CFS)
modeled
gaged
900
800
700
600
500
400
300
200
100
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

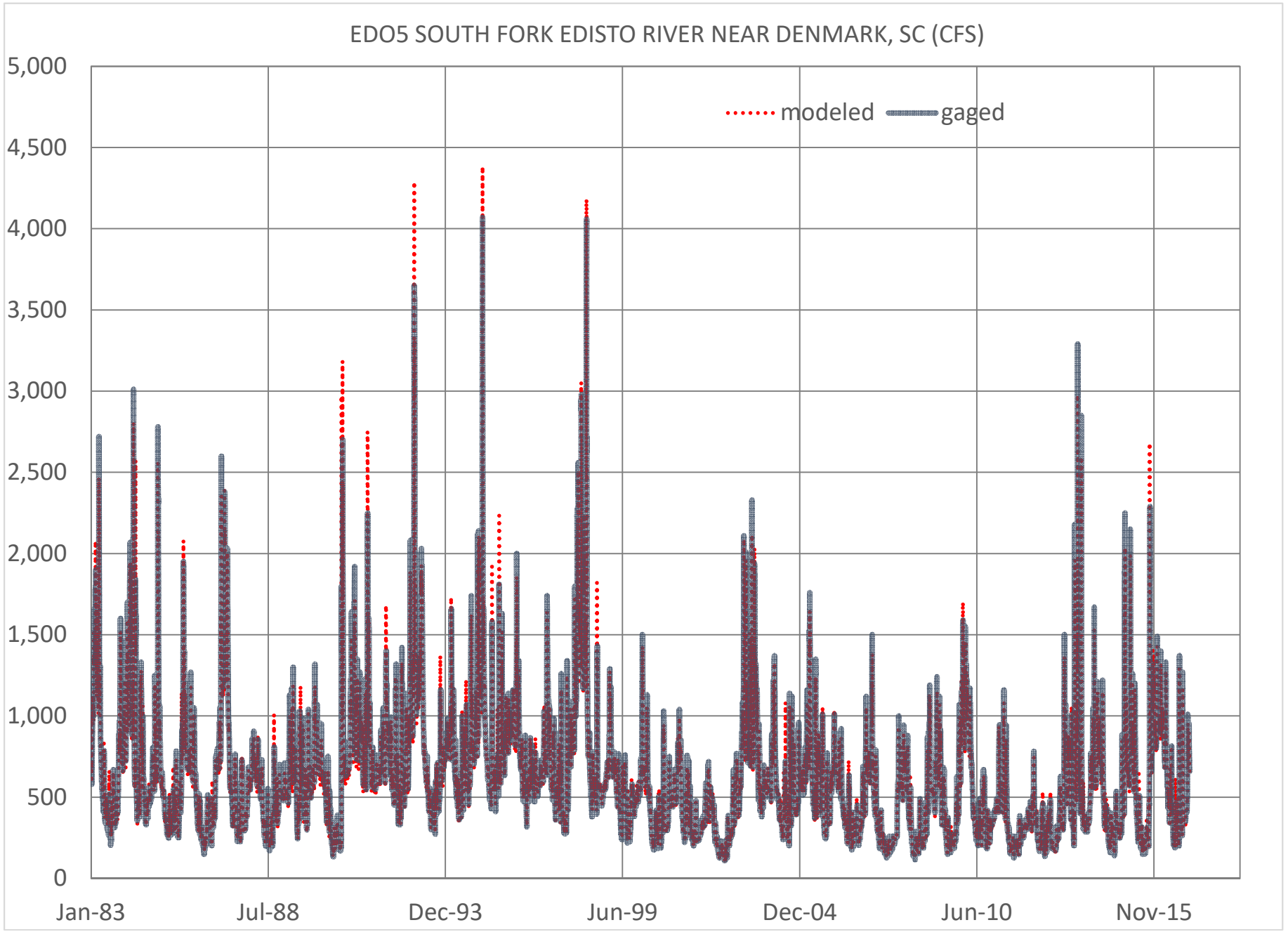

EDO 01 McTier Creek (RD 209) Near Monetta, SC
Daily Flow Percentiles (CFS)
300
250
200
150
100
50
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

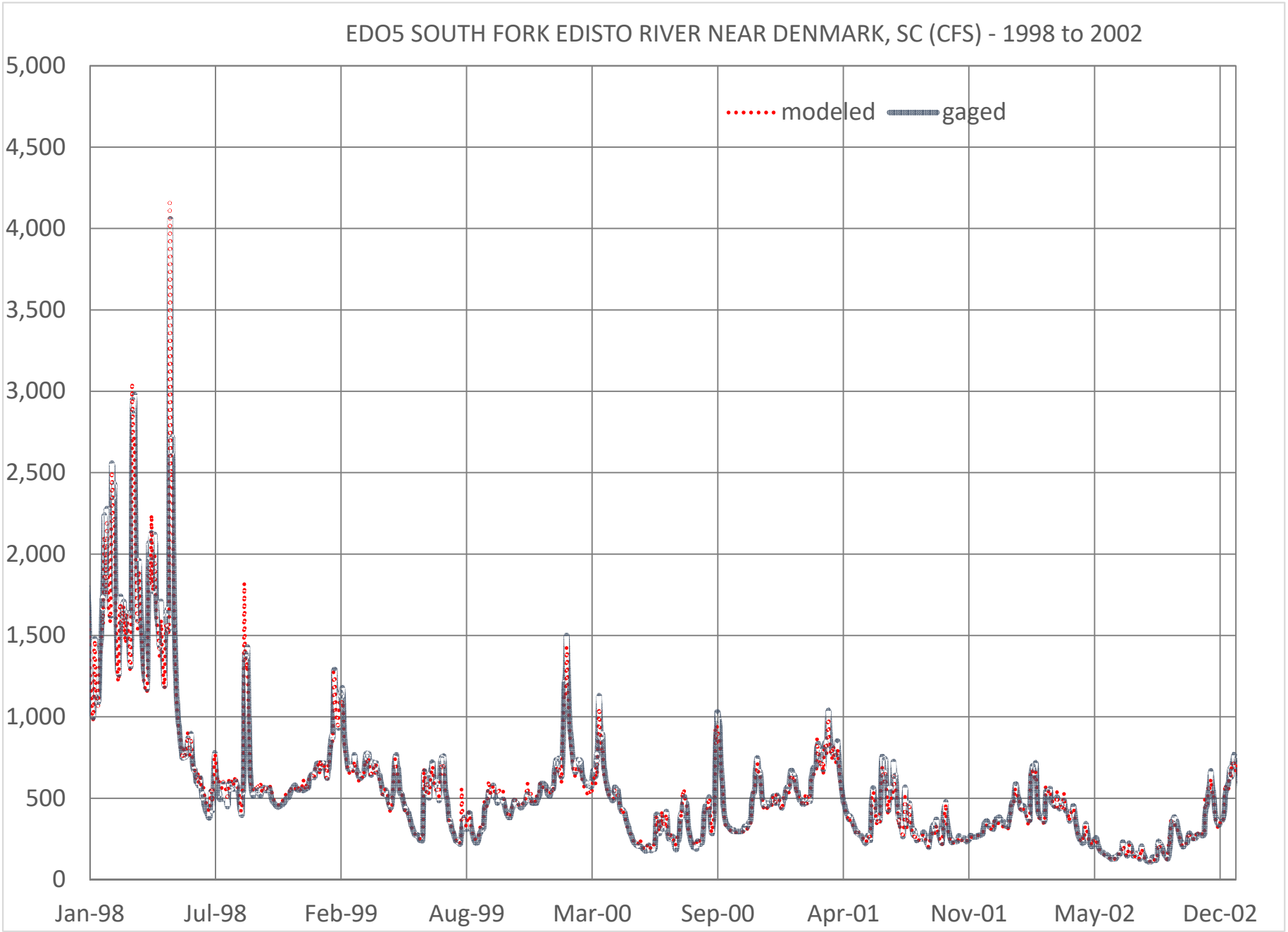

EDO2 MCTIER CREEK NEAR NEW HOLLAND, SC (CFS)
2,500
2,000
1,500
1,000
500
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

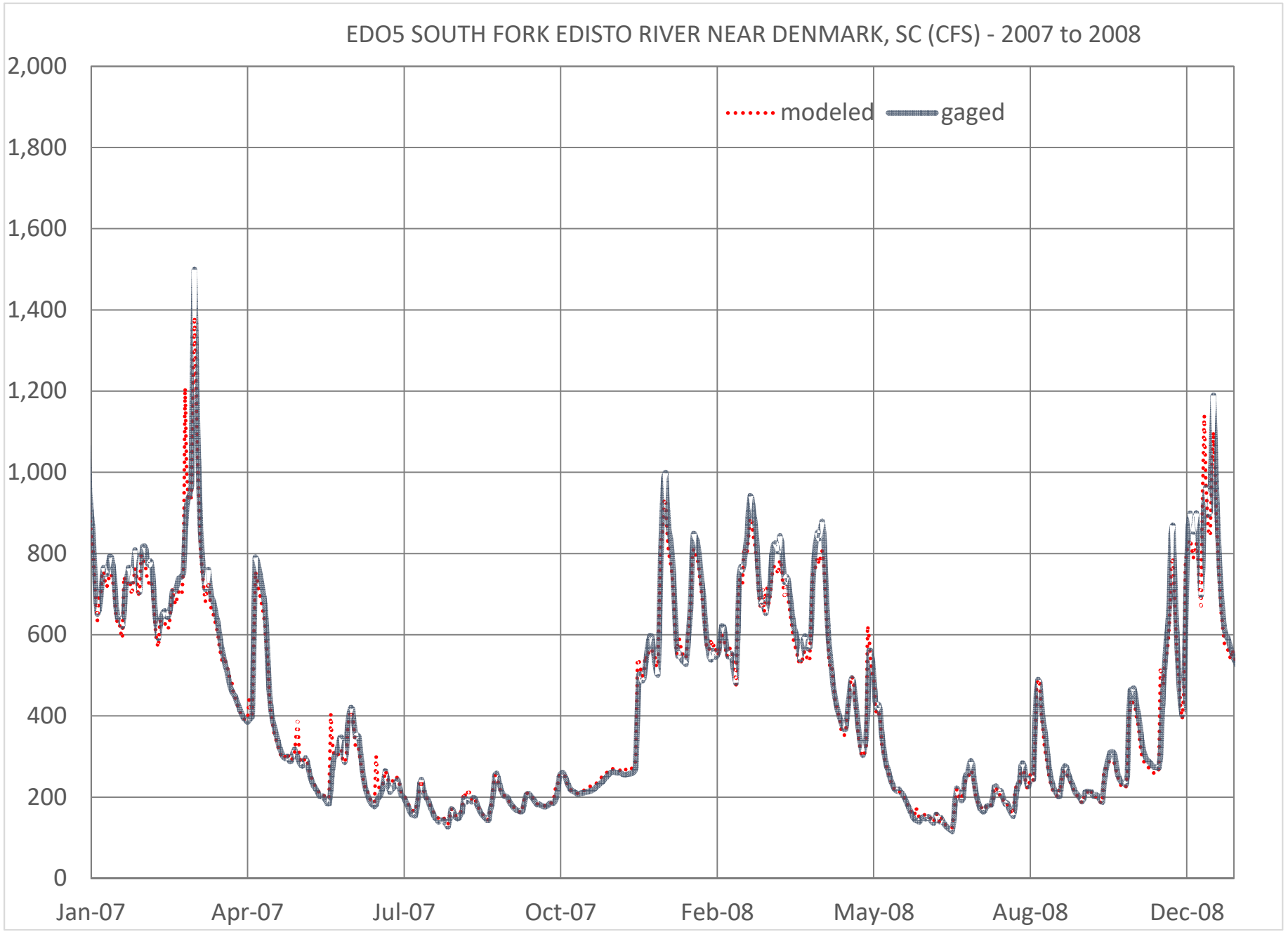

EDO2 MCTIER CREEK NEAR NEW HOLLAND, SC
Daily Flow Percentiles (CFS)
250
200
150
100
50
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

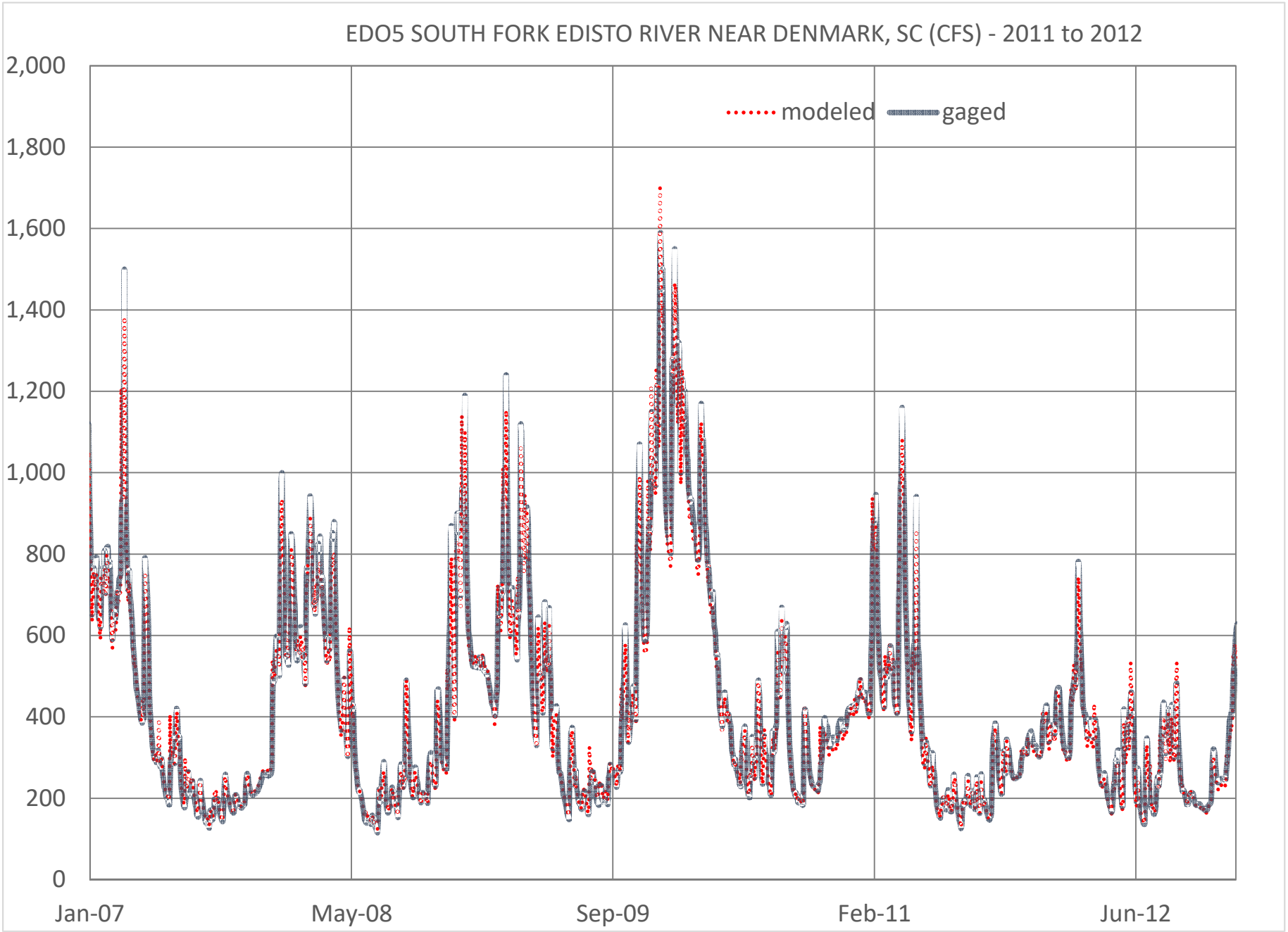

EDO4 DEAN SWAMP CREEK NR SALLEY, SC (CFS)
120
100
80
60
40
20
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

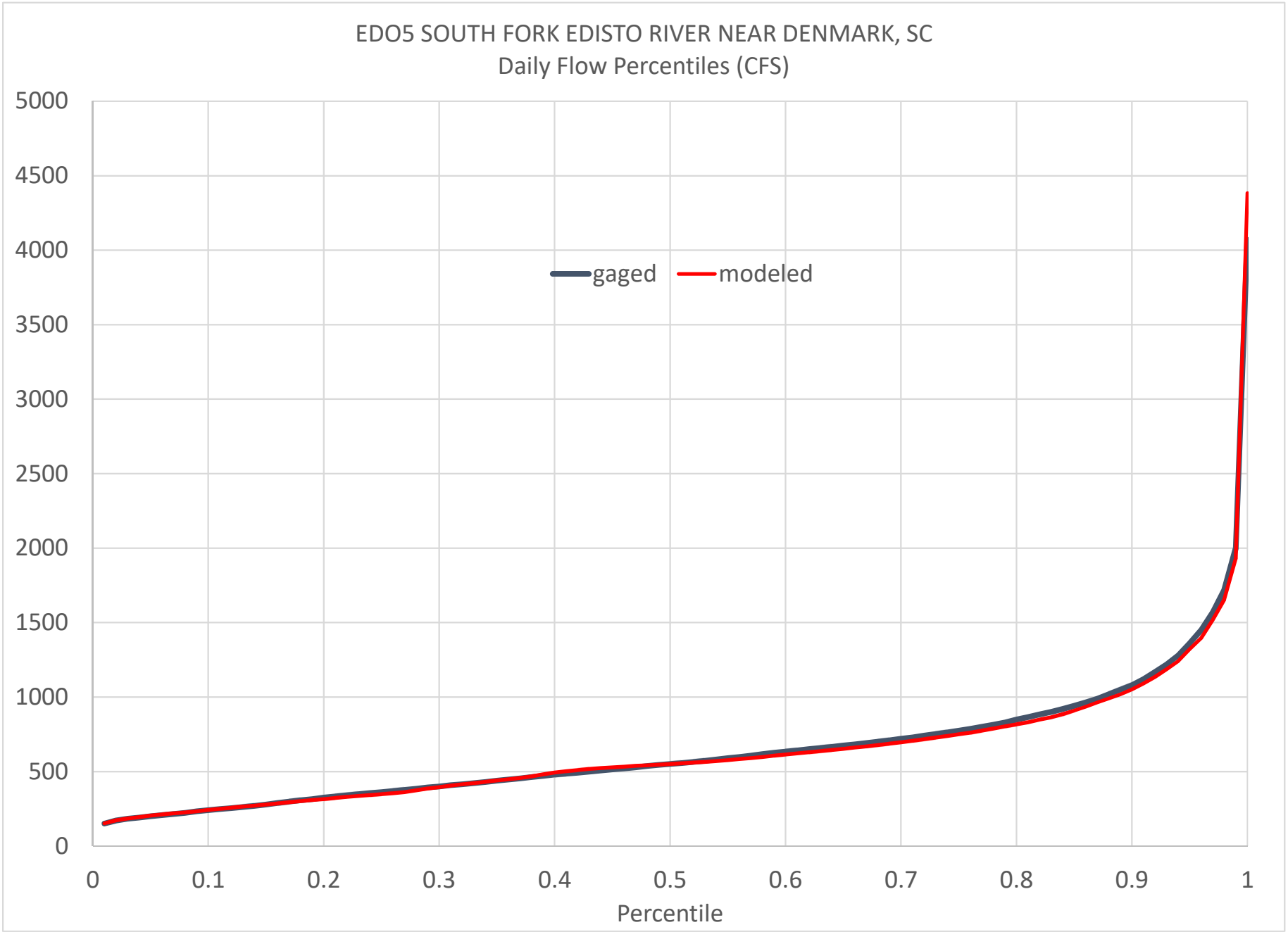

EDO4 DEAN SWAMP CREEK NR SALLEY, SC
Daily Flow Percentiles (CFS)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

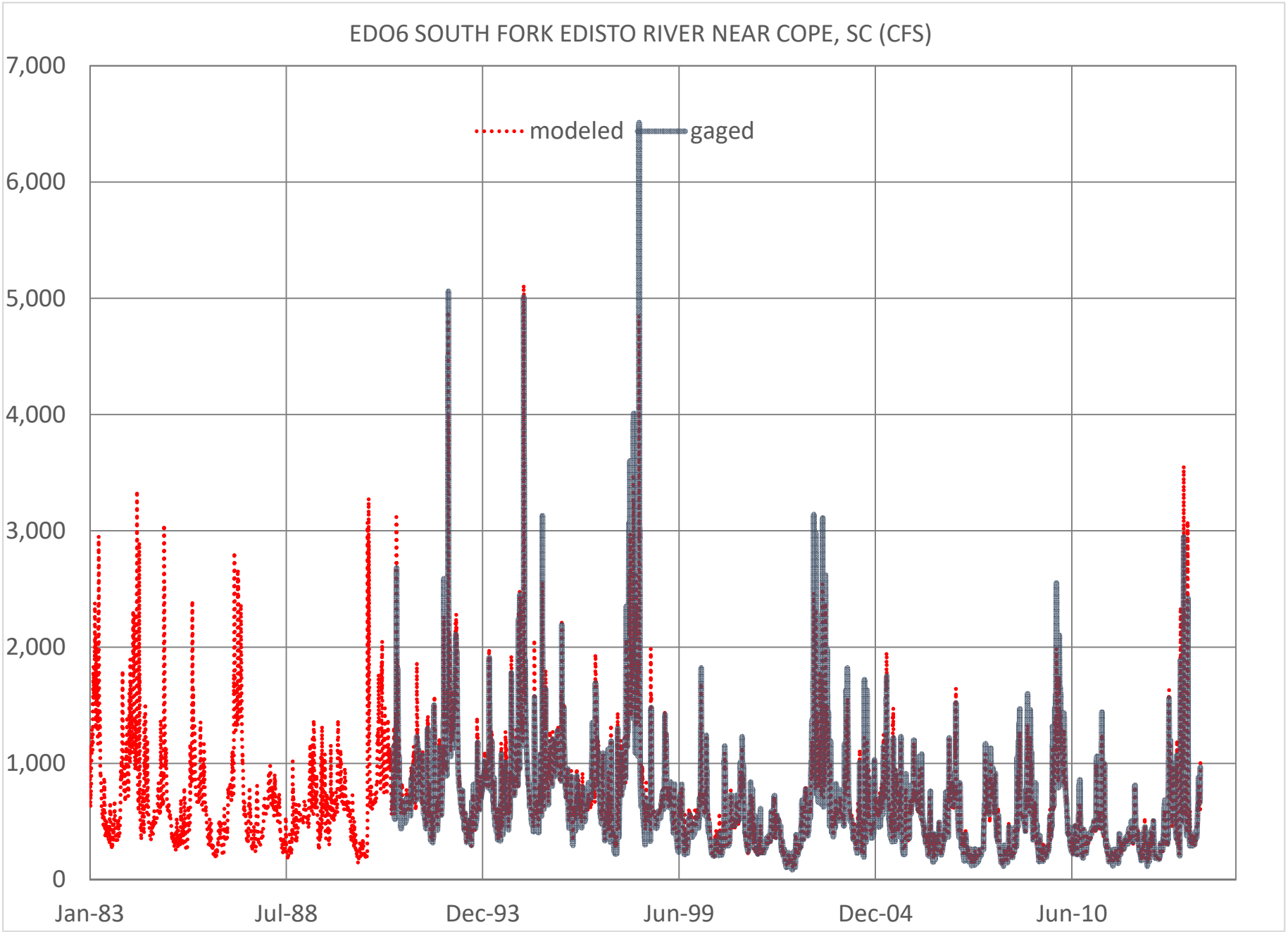

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC (CFS)
modeled
gaged
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10
Nov-15

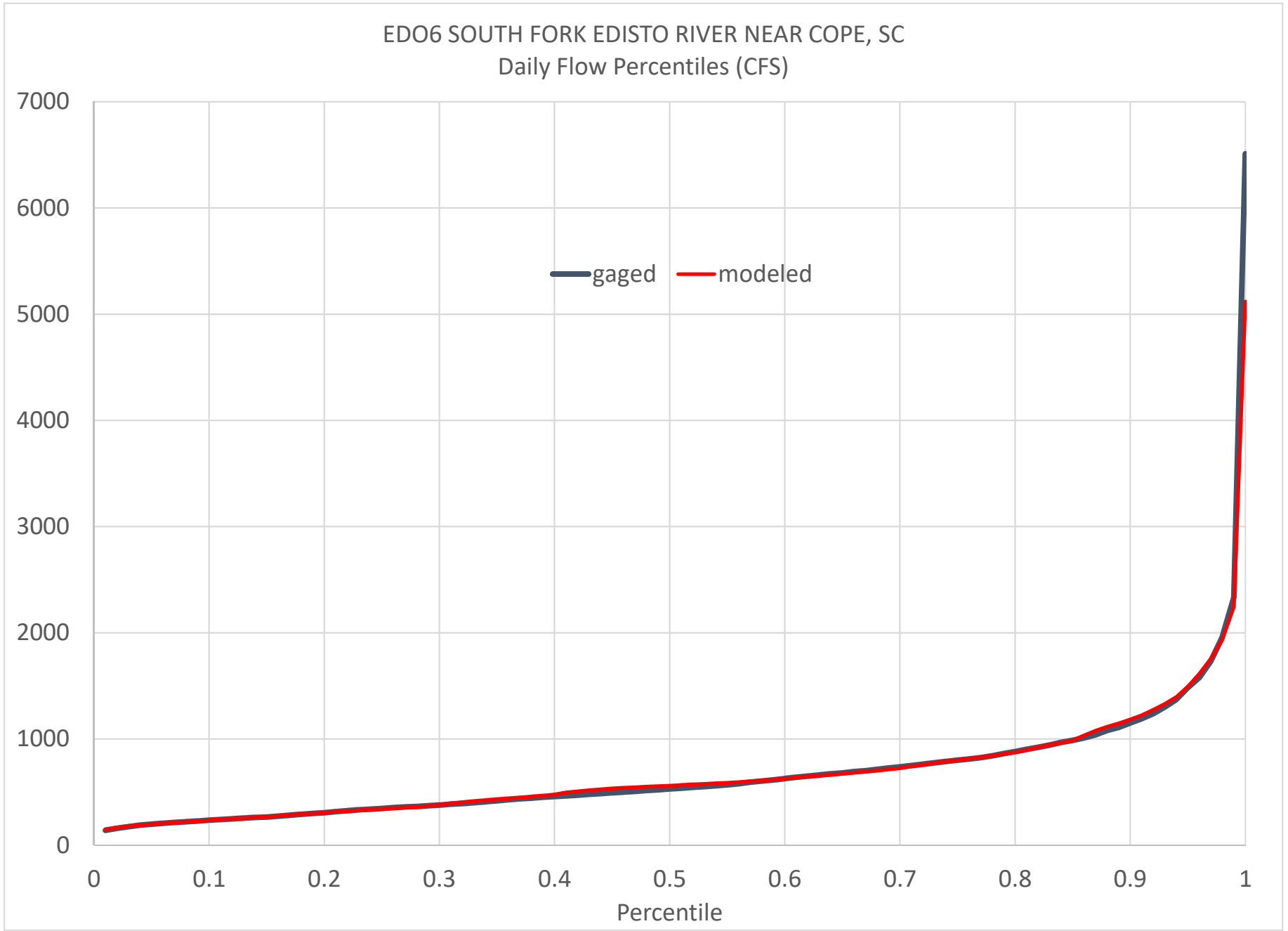

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC (CFS) - 1998 to 2002
modeled
gaged
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-98
Jul-98
Feb-99
Aug-99
Mar-00
Sep-00
Apr-01
Nov-01
May-02
Dec-02

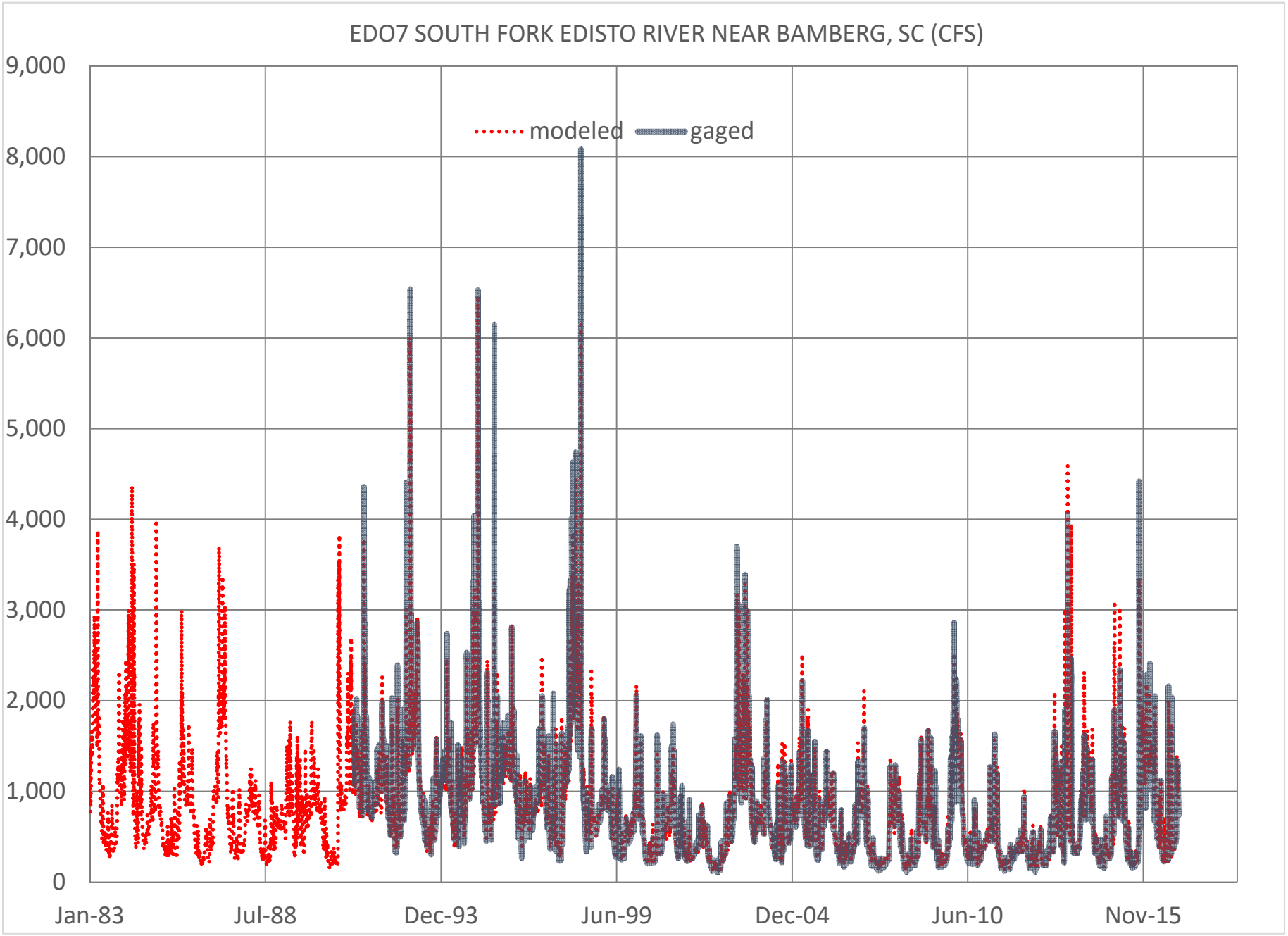

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC (CFS) - 2007 to 2008
modeled
gaged
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan-07
Apr-07
Jul-07
Oct-07
Feb-08
May-08
Aug-08
Dec-08

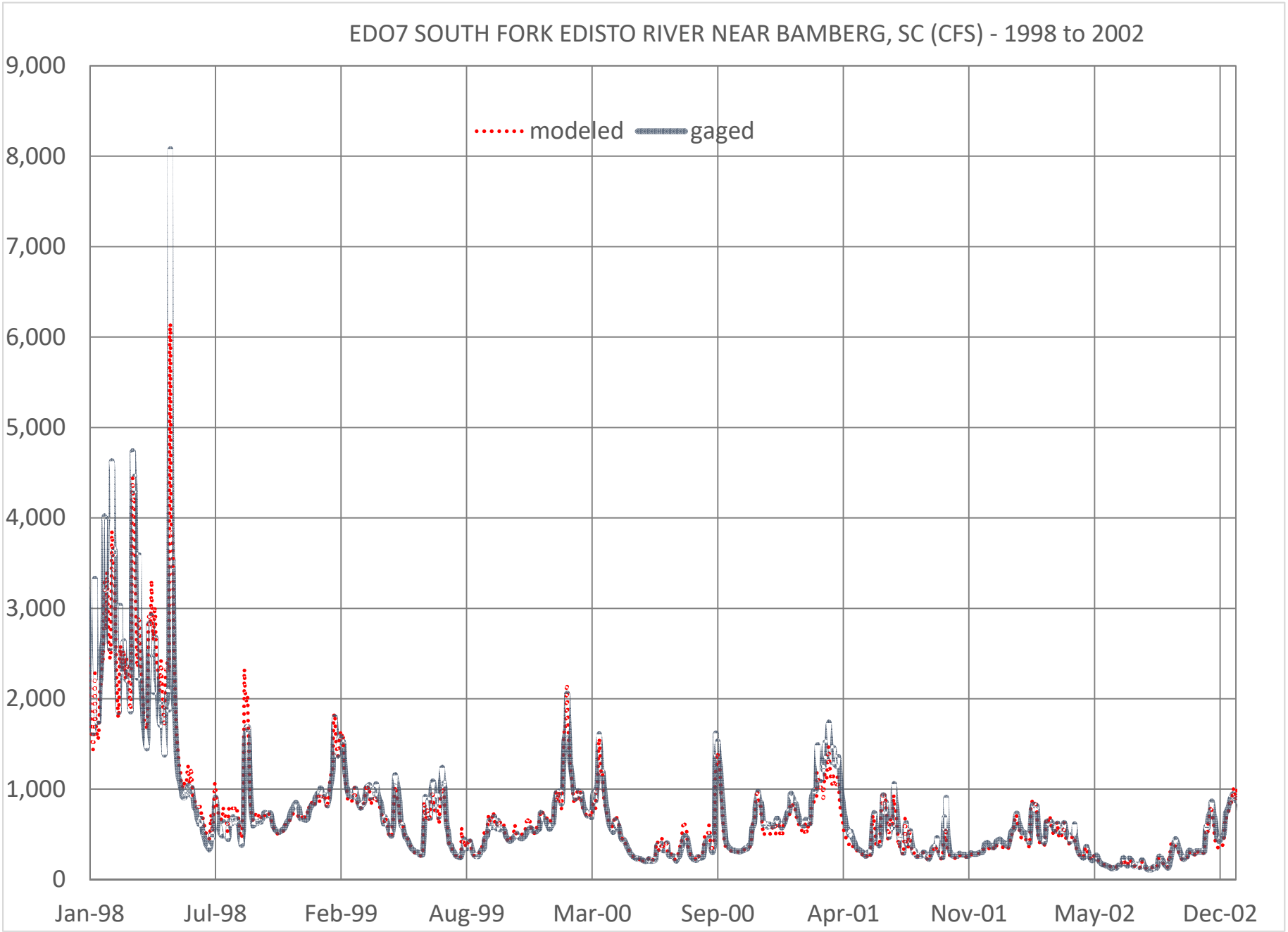

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC (CFS) - 2011 to 2012
modeled
gaged
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan-07
May-08
Sep-09
Feb-11
Jun-12

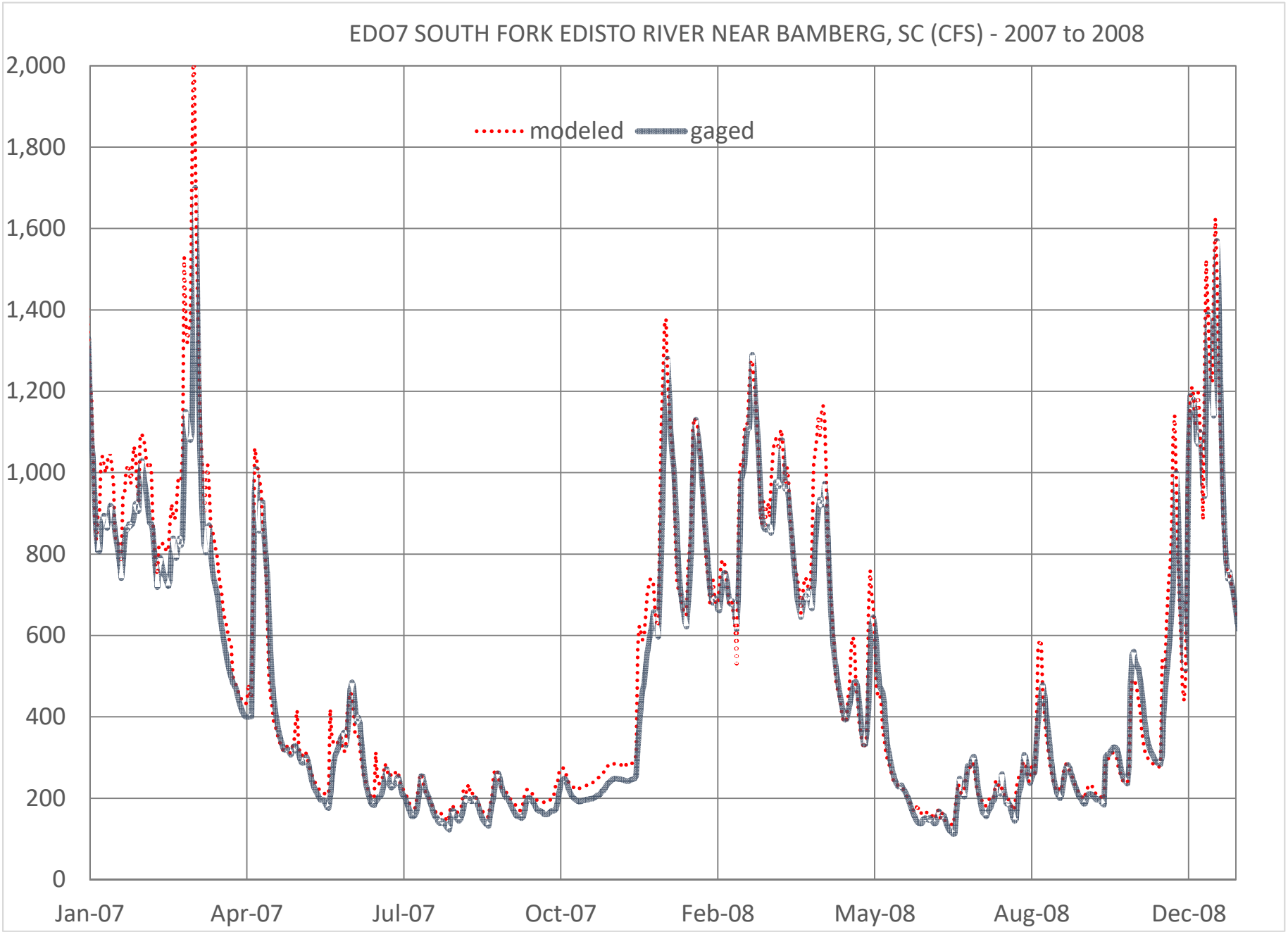

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC
Daily Flow Percentiles (CFS)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

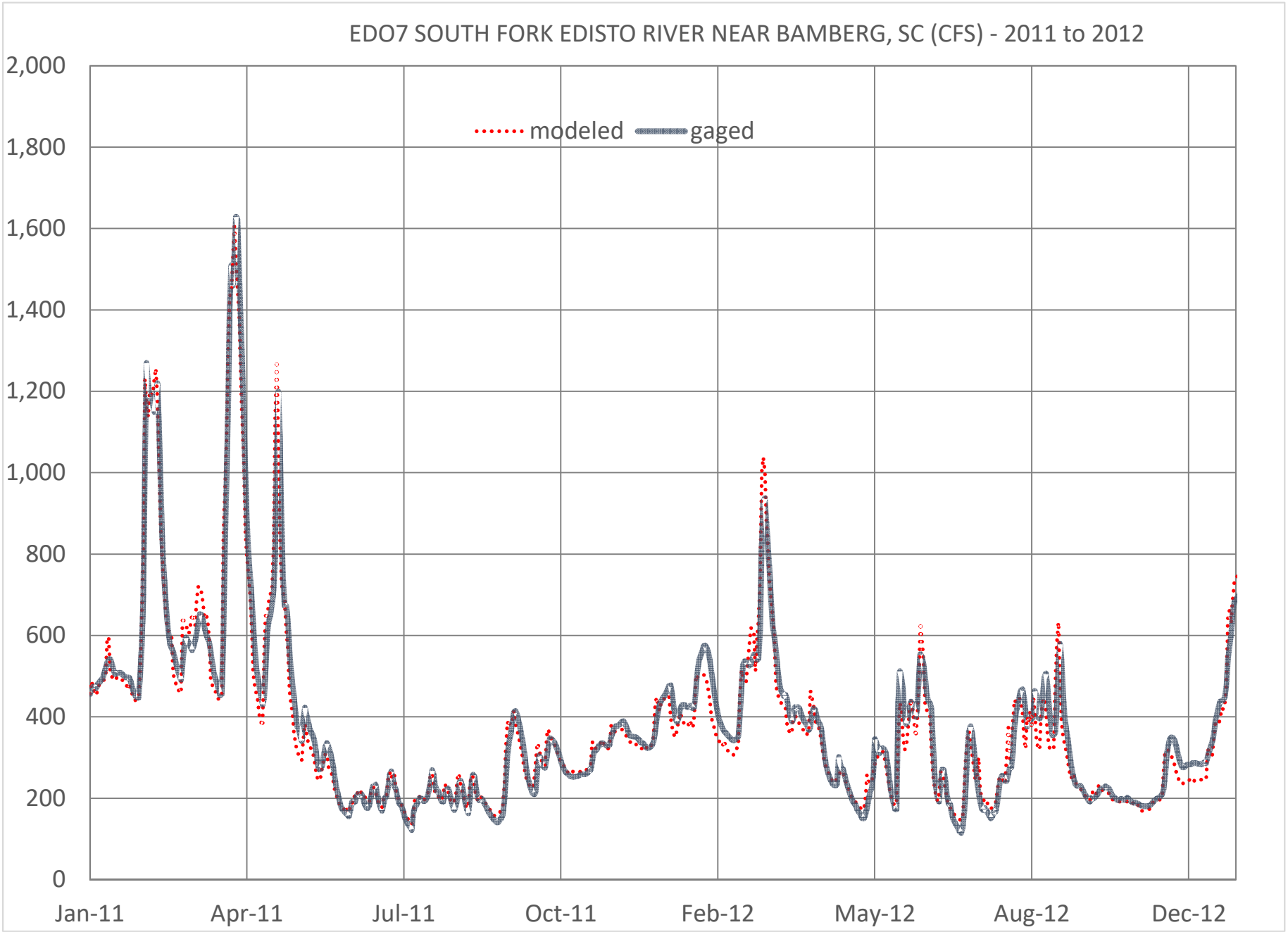

EDO6 SOUTH FORK EDISTO RIVER NEAR COPE, SC (CFS)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

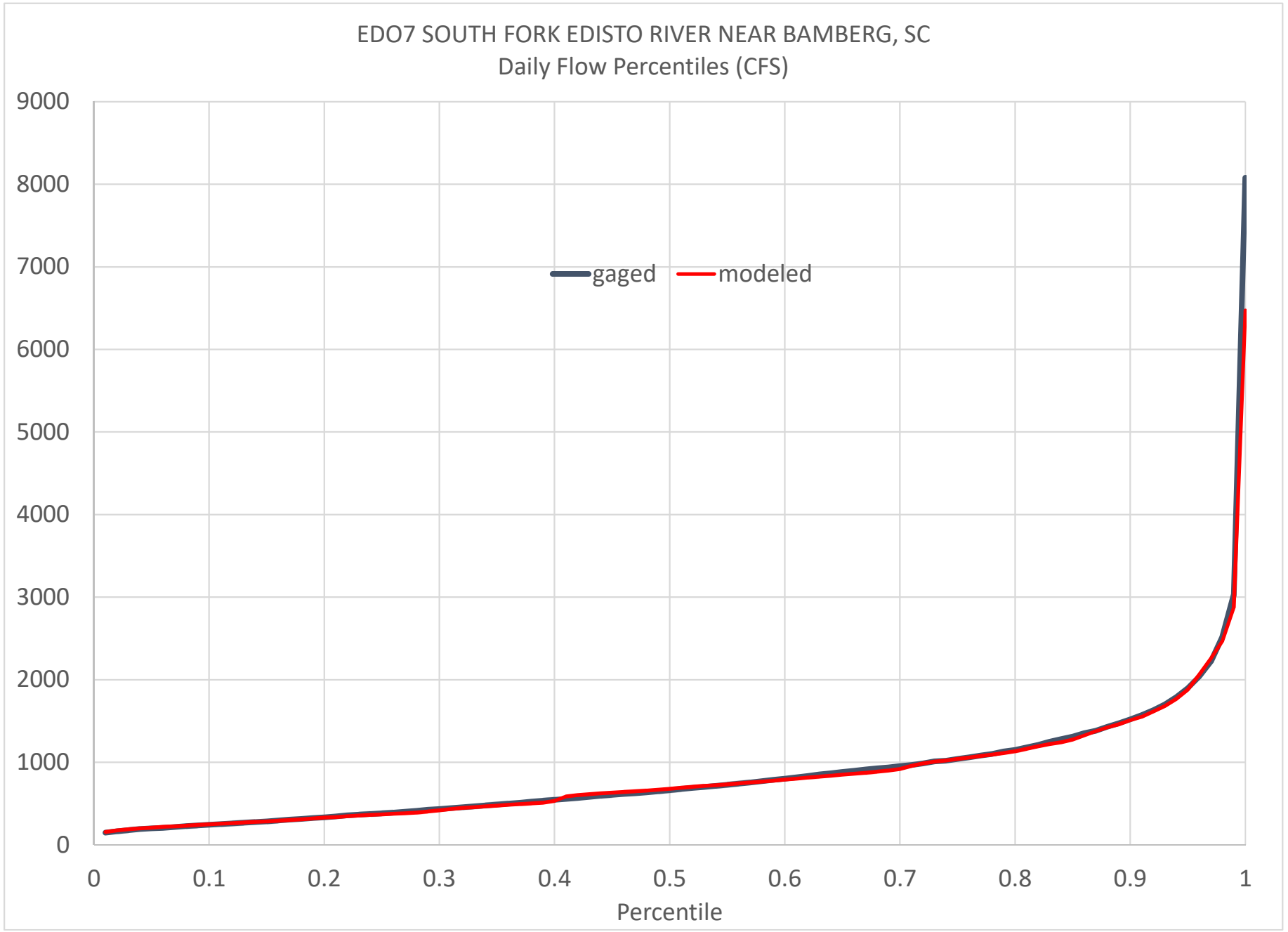

EDO6 SOUTH FORK EDISTO RIVER NEAR COPE, SC
Daily Flow Percentiles (CFS)
7000
6000
5000
4000
3000
2000
1000
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

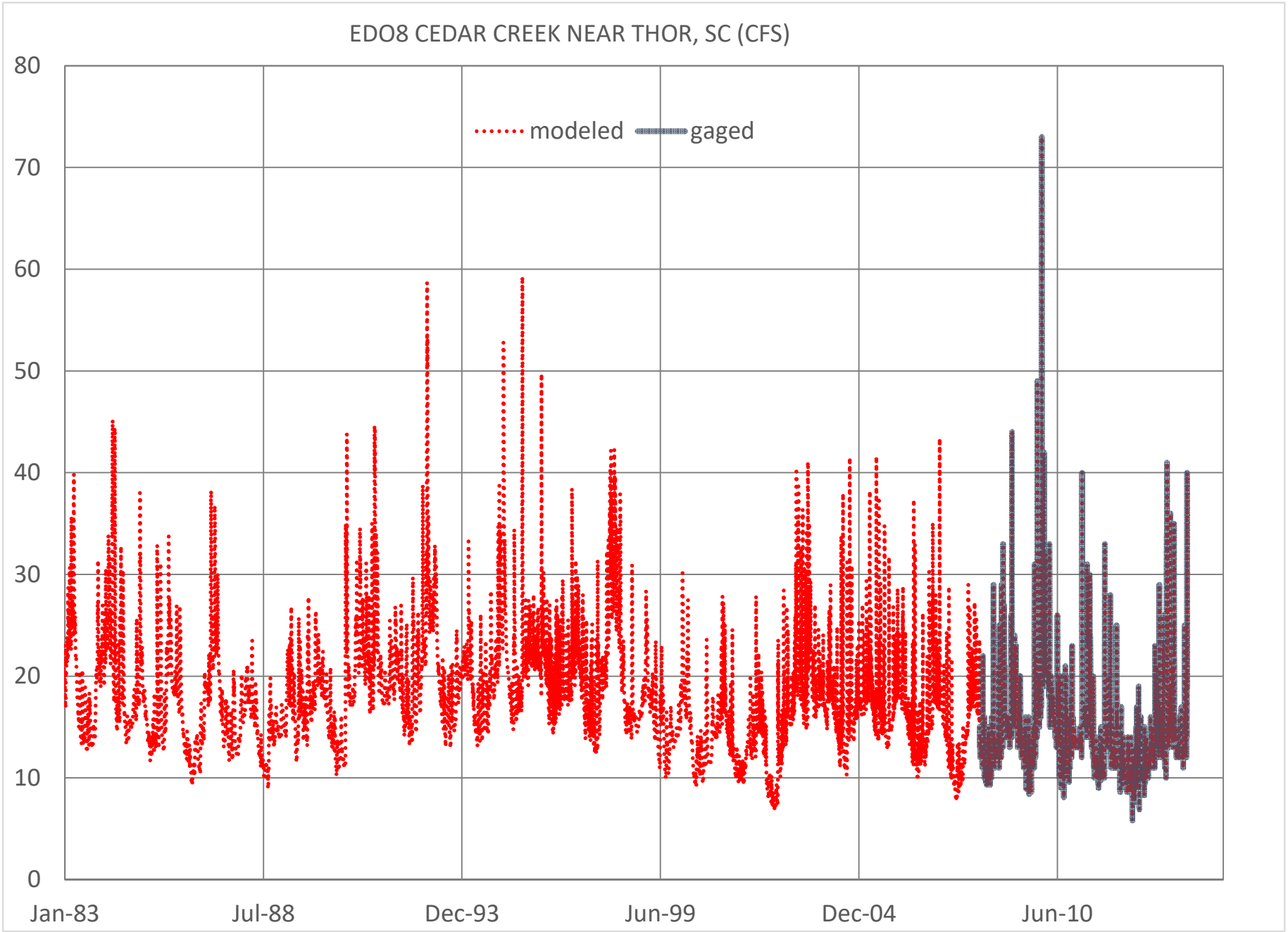

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC (CFS)
modeled
gaged
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10
Nov-15

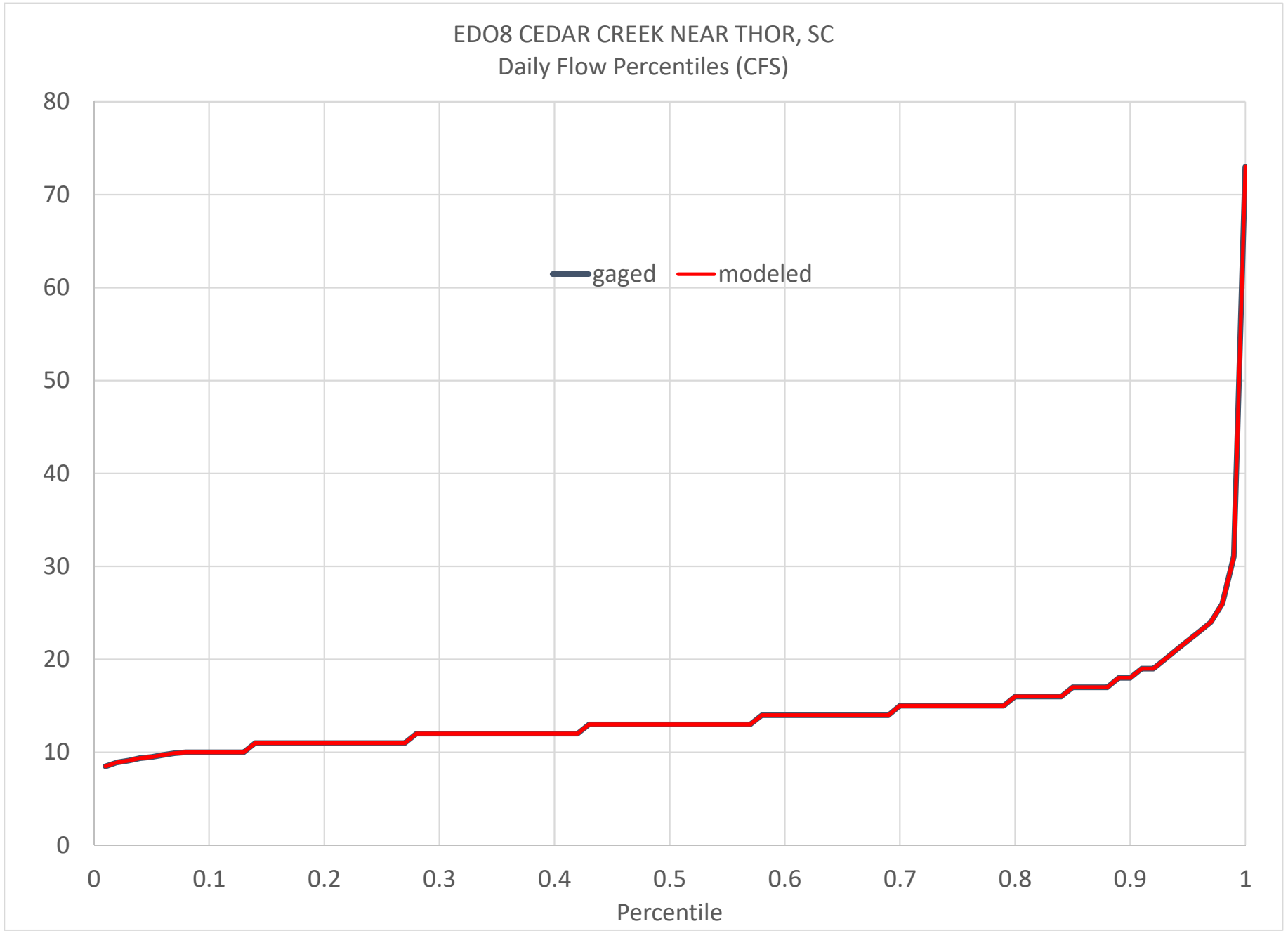

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC (CFS) - 1998 to 2002
modeled
gaged
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-98
Jul-98
Feb-99
Aug-99
Mar-00
Sep-00
Apr-01
Nov-01
May-02
Dec-02

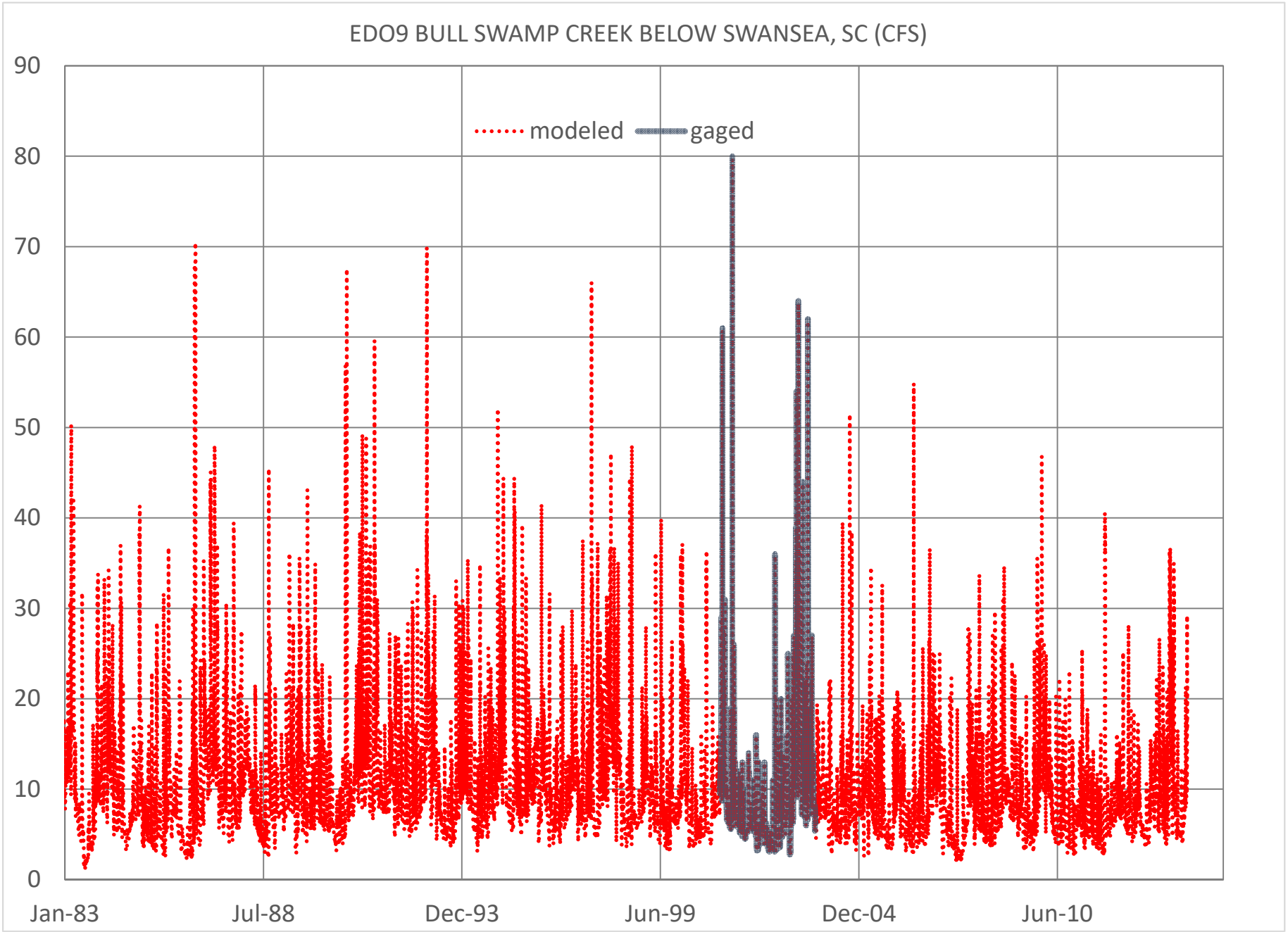

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC (CFS) - 2007 to 2008
modeled
gaged
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan-07
Apr-07
Jul-07
Oct-07
Feb-08
May-08
Aug-08
Dec-08

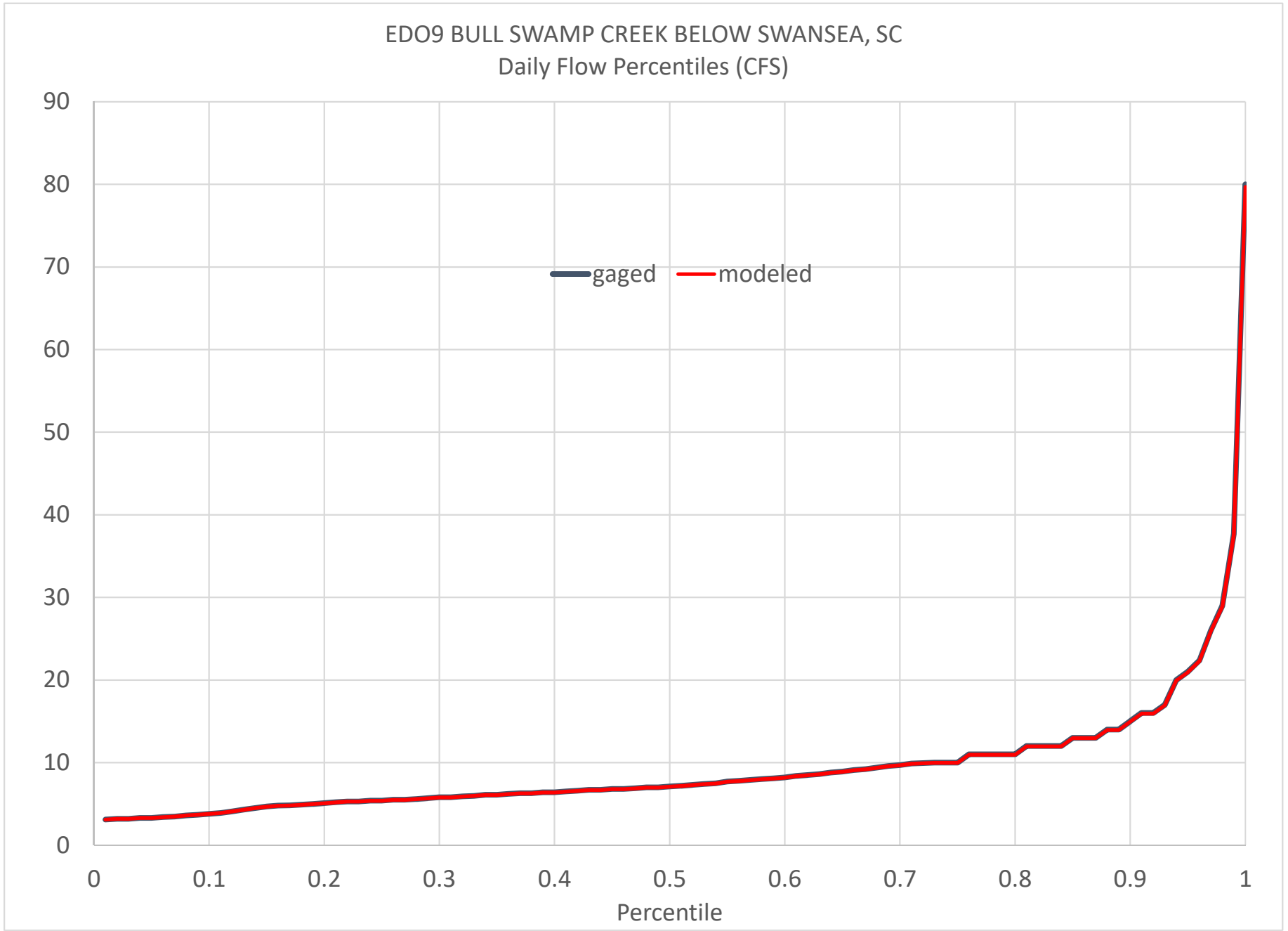

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC (CFS) - 2011 to 2012
modeled
gaged
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan-11
Apr-11
Jul-11
Oct-11
Feb-12
May-12
Aug-12
Dec-12

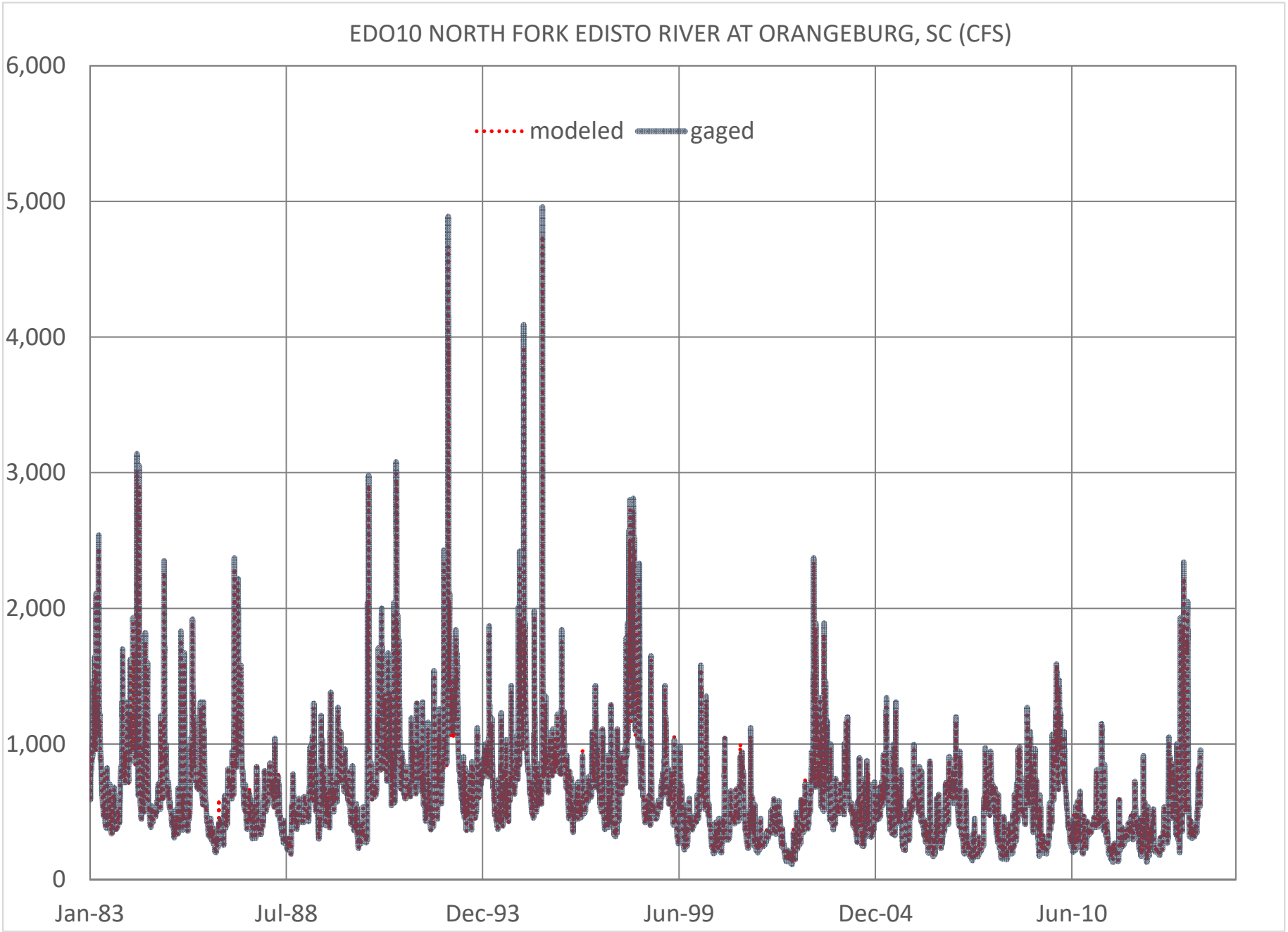

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC
Daily Flow Percentiles (CFS)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

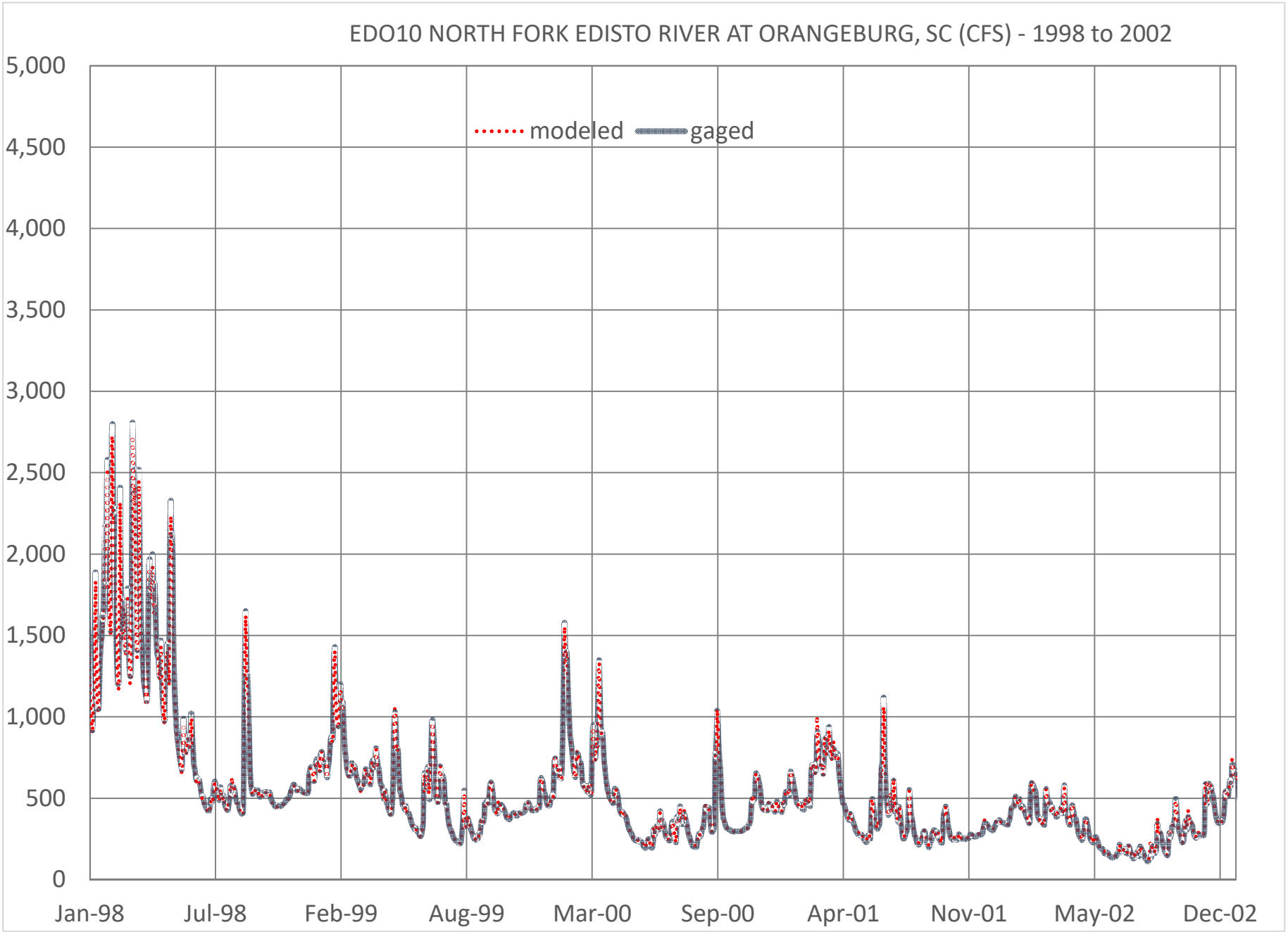

EDO8 CEDAR CREEK NEAR THOR, SC (CFS)
80
70
60
50
40
30
20
10
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10


EDO8 CEDAR CREEK NEAR THOR, SC
Daily Flow Percentiles (CFS)
80
70
60
50
40
30
20
10
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

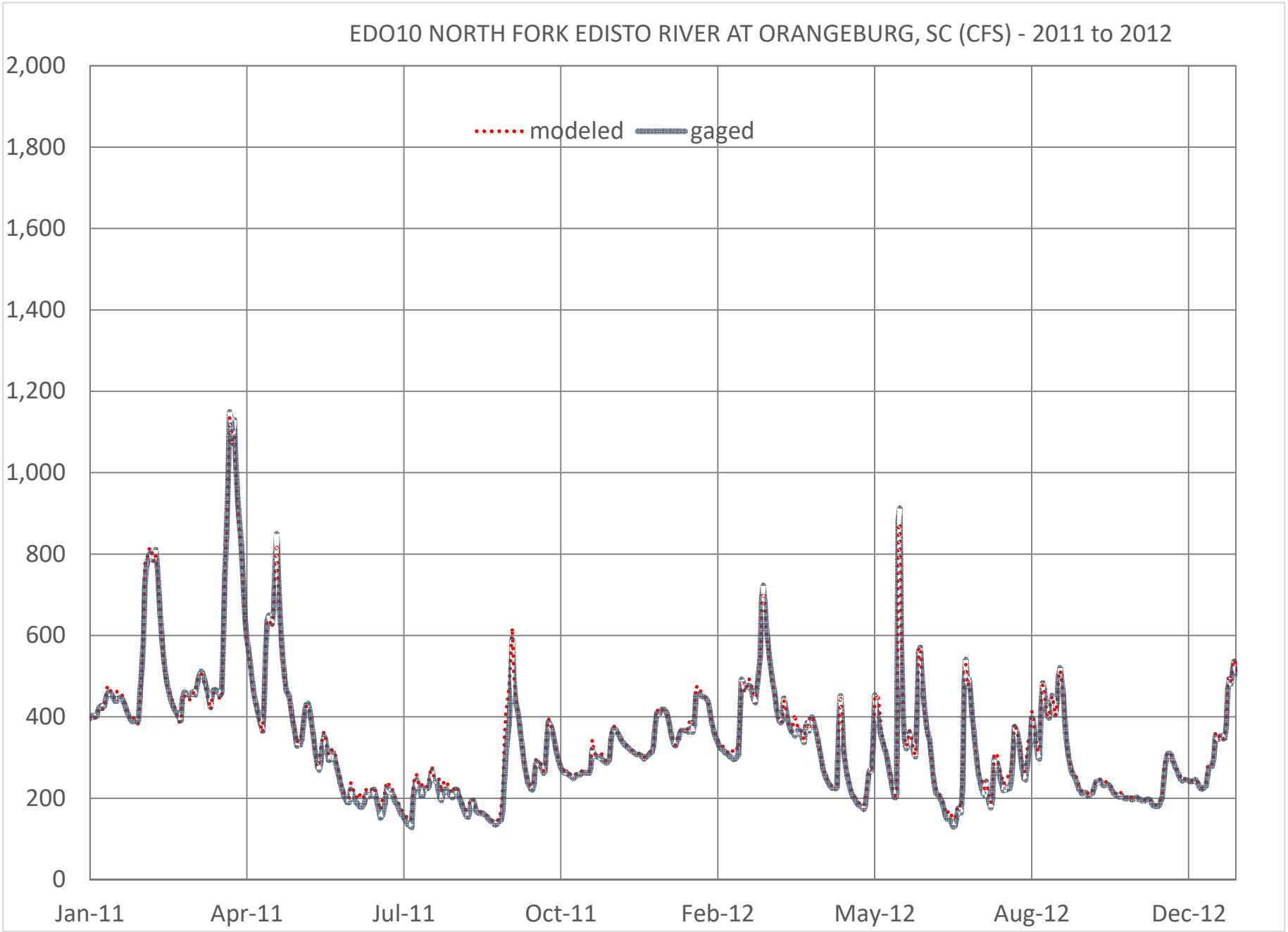

EDO9 BULL SWAMP CREEK BELOW SWANSEA, SC (CFS)
modeled
gaged
90
80
70
60
50
40
30
20
10
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

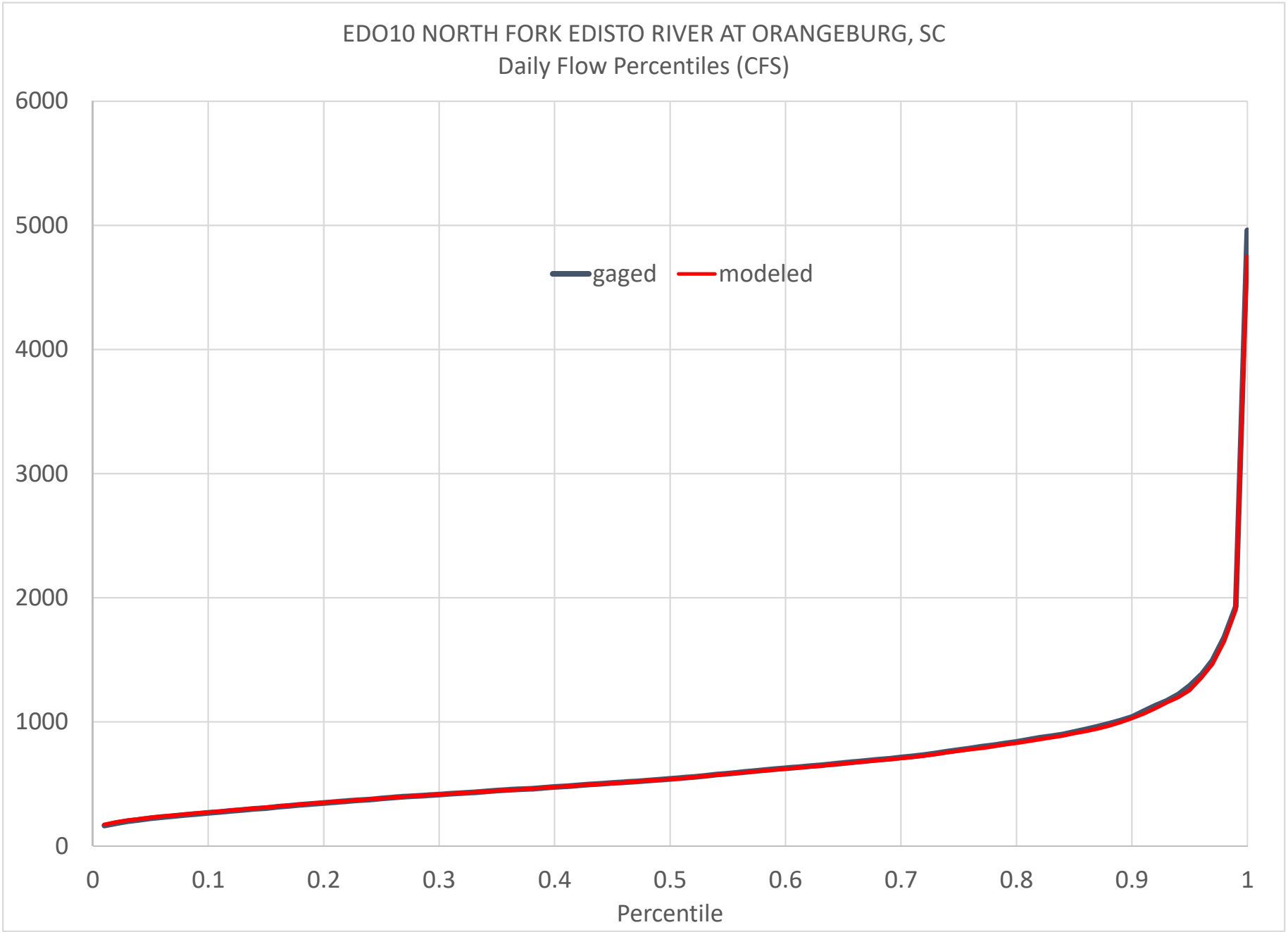

EDO9 BULL SWAMP CREEK BELOW SWANSEA, SC
Daily Flow Percentiles (CFS)
90
80
70
60
50
40
30
20
10
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

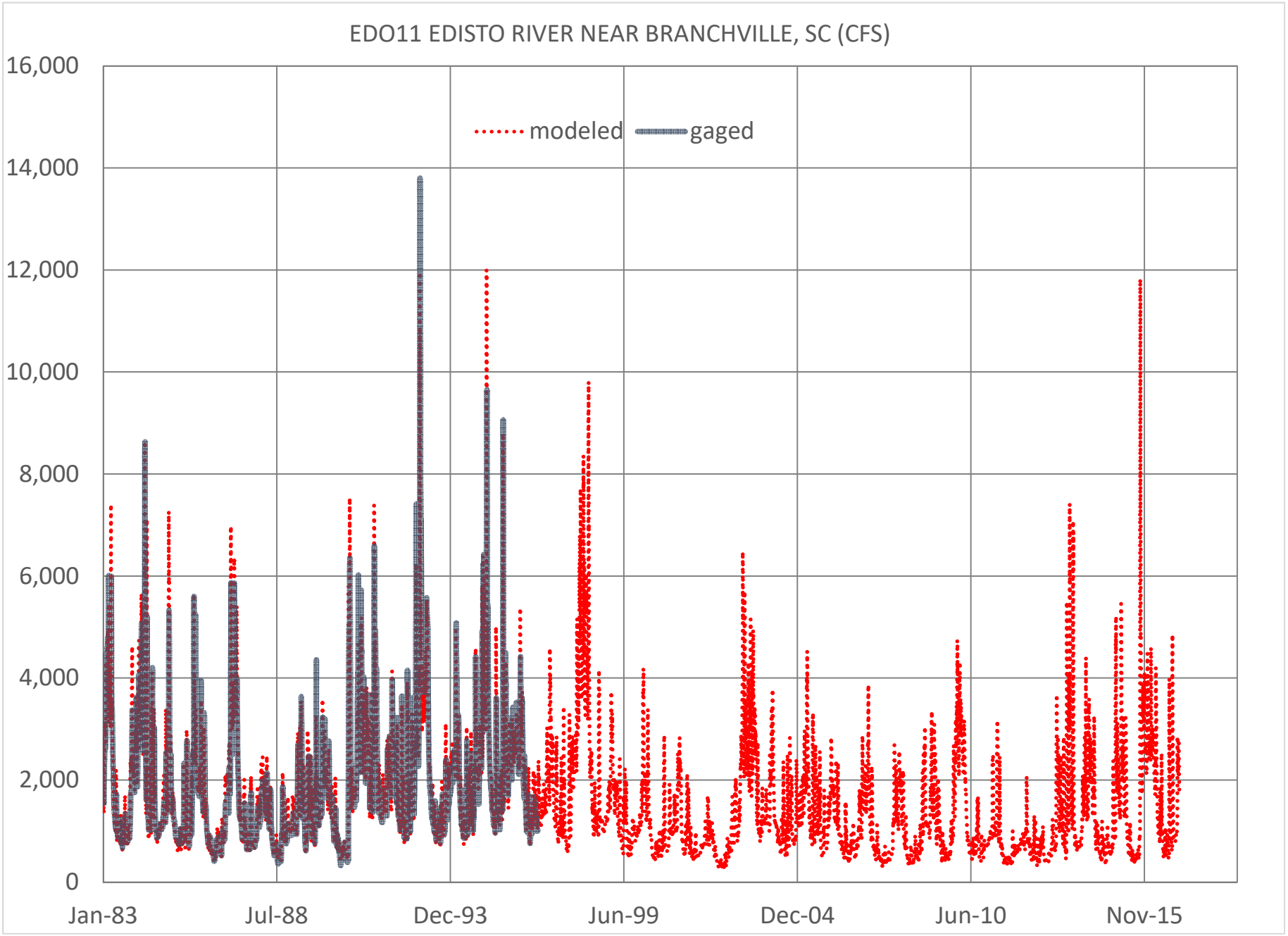

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC (CFS)
modeled
gaged
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

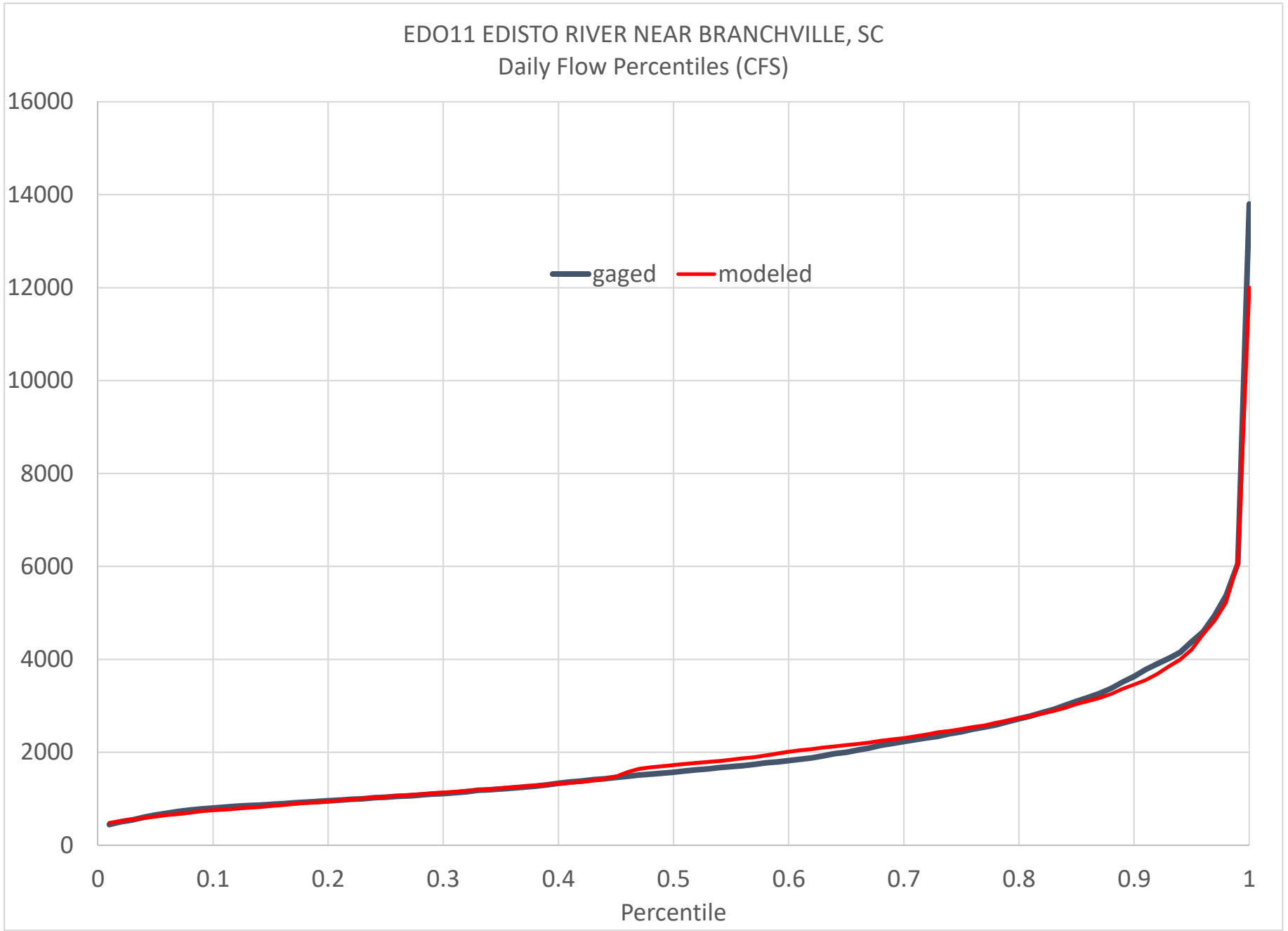

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC (CFS) - 1998 to 2002
modeled
gaged
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-98
Jul-98
Feb-99
Aug-99
Mar-00
Sep-00
Apr-01
Nov-01
May-02
Dec-02

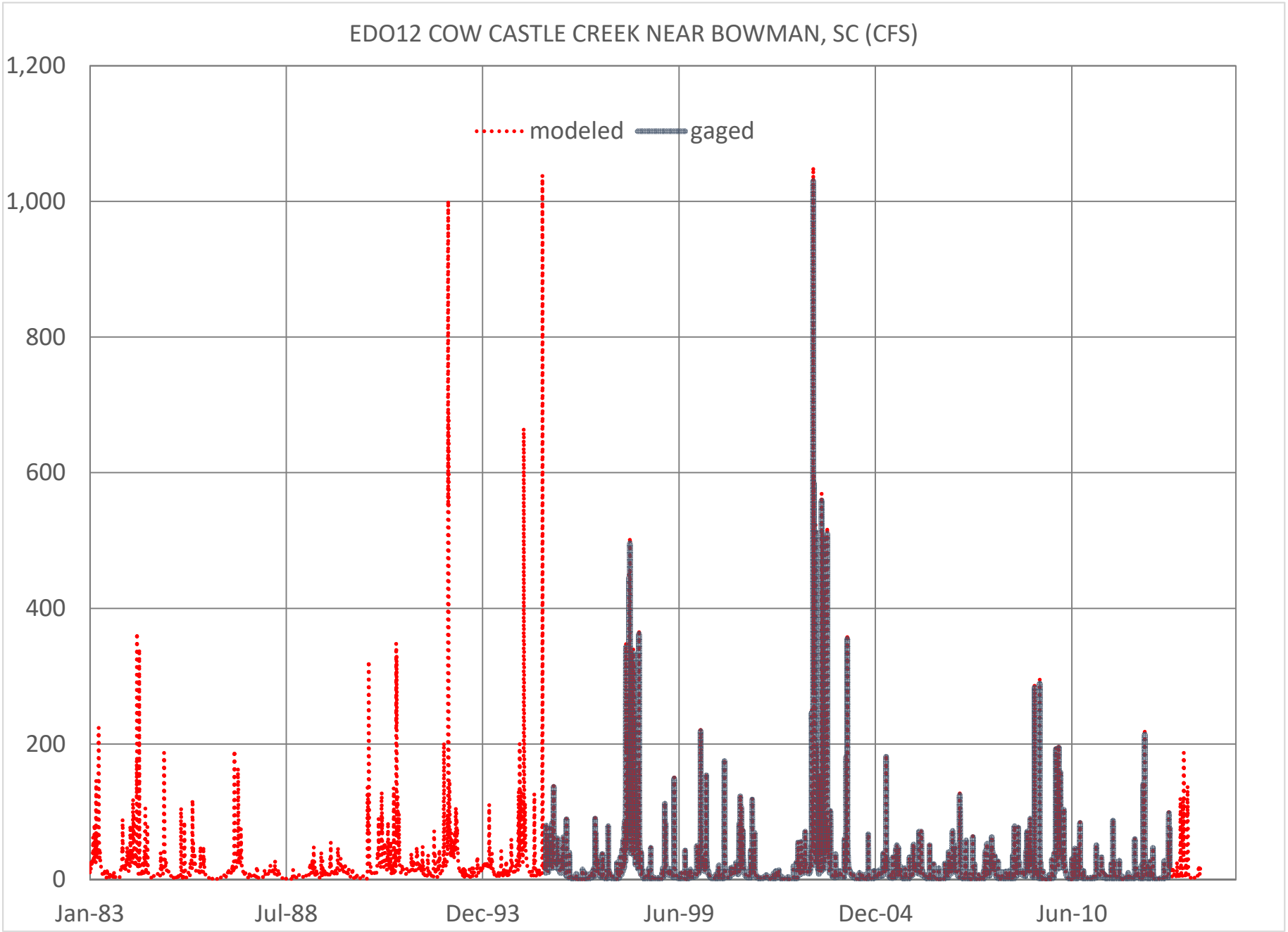

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC (CFS) - 2007 to 2008
modeled
gaged
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan-07
Apr-07
Jul-07
Oct-07
Feb-08
May-08
Aug-08
Dec-08

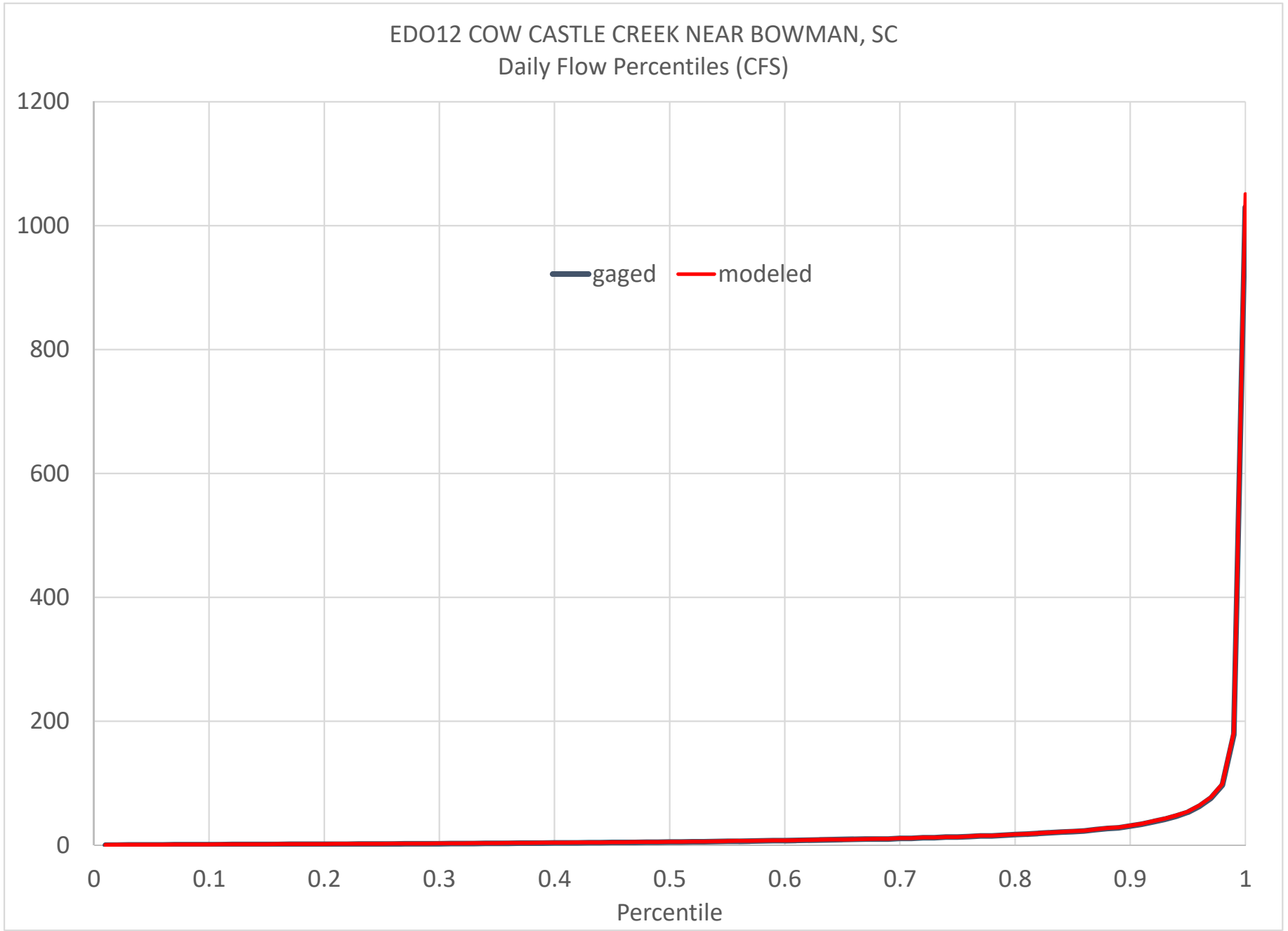

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC (CFS) - 2011 to 2012
modeled
gaged
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan-11
Apr-11
Jul-11
Oct-11
Feb-12
May-12
Aug-12
Dec-12

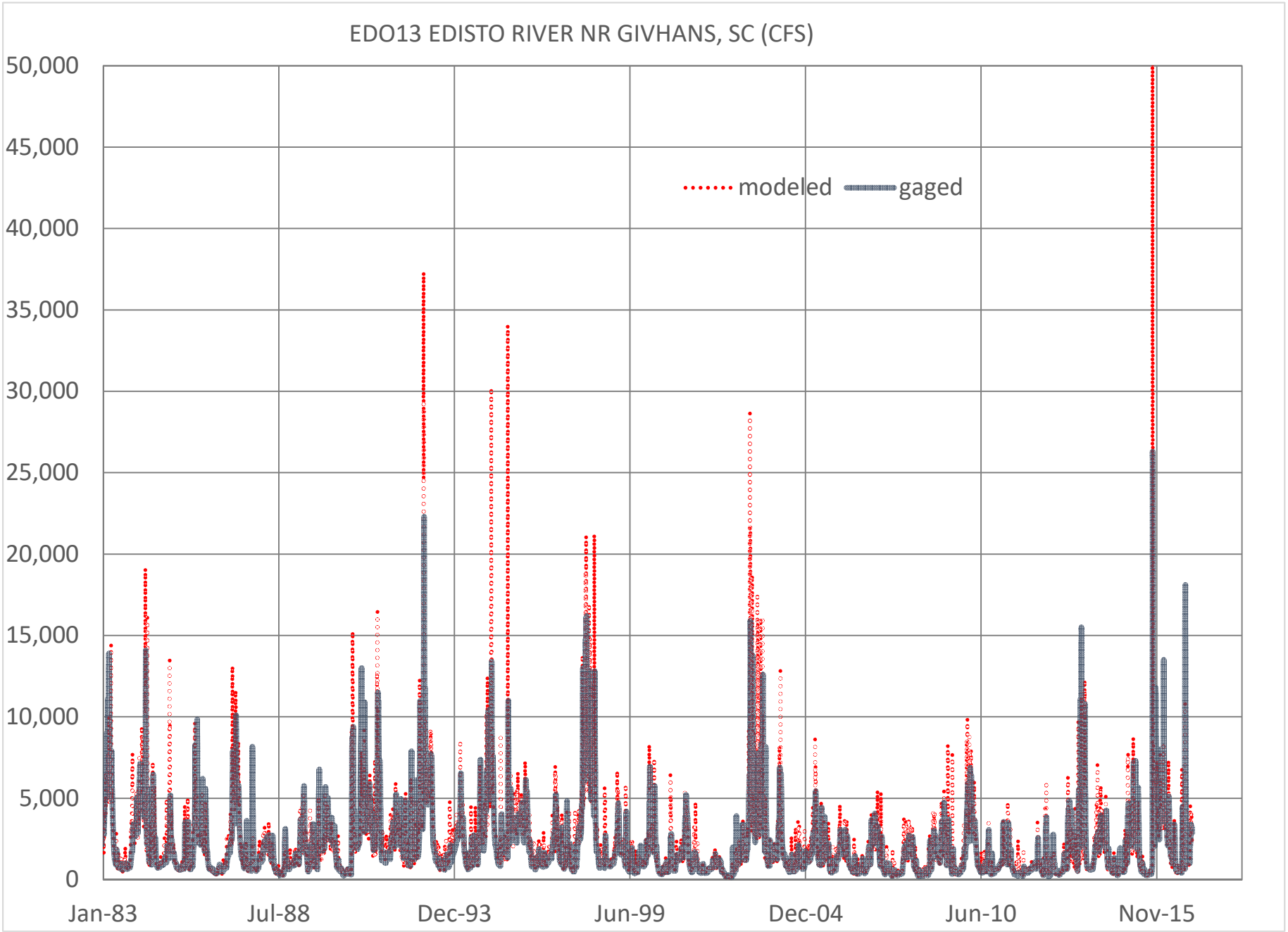

EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC
Daily Flow Percentiles (CFS)
6000
5000
4000
3000
2000
1000
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

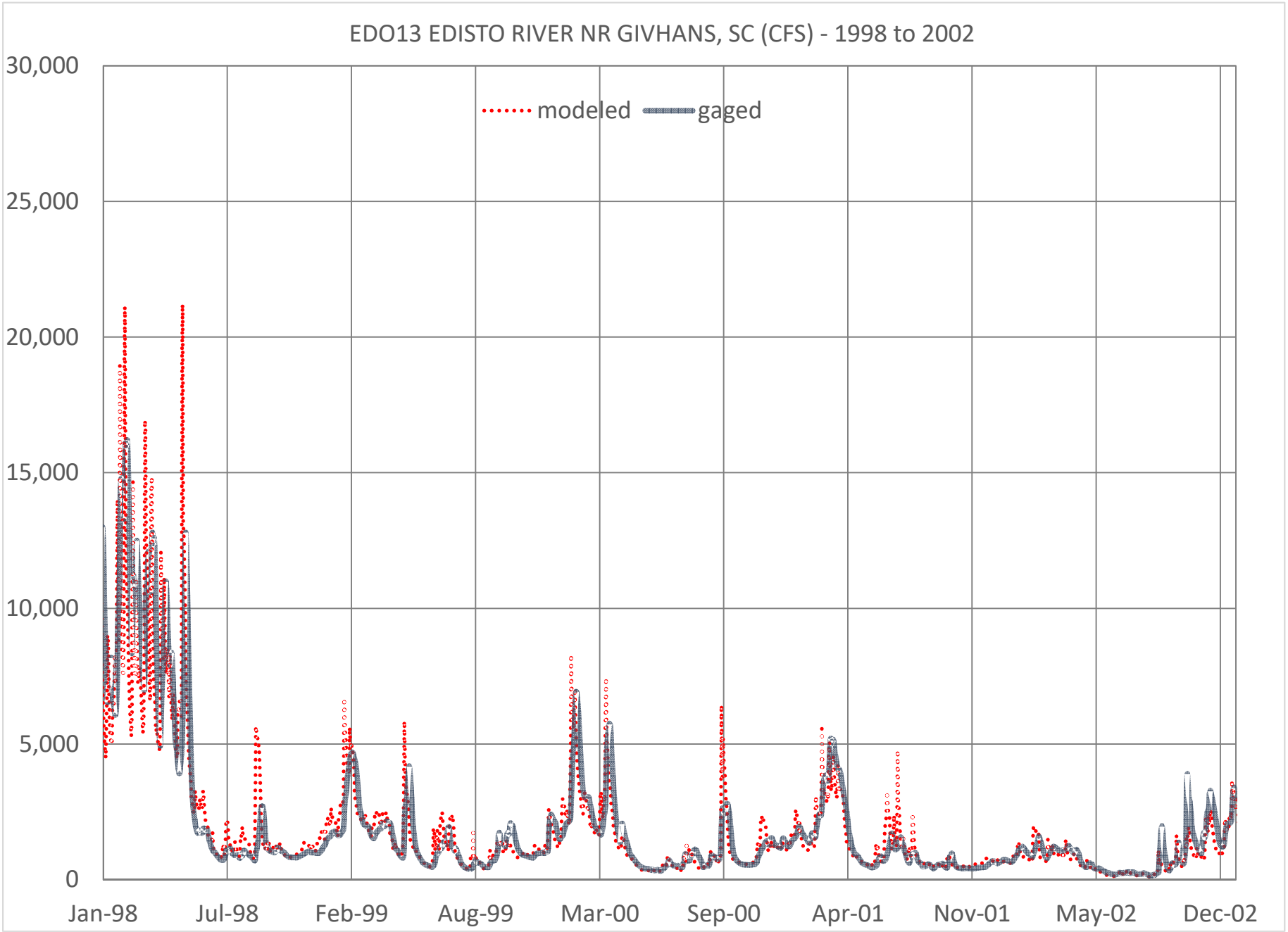

EDO11 EDISTO RIVER NEAR BRANCHVILLE, SC (CFS)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10
Nov-15

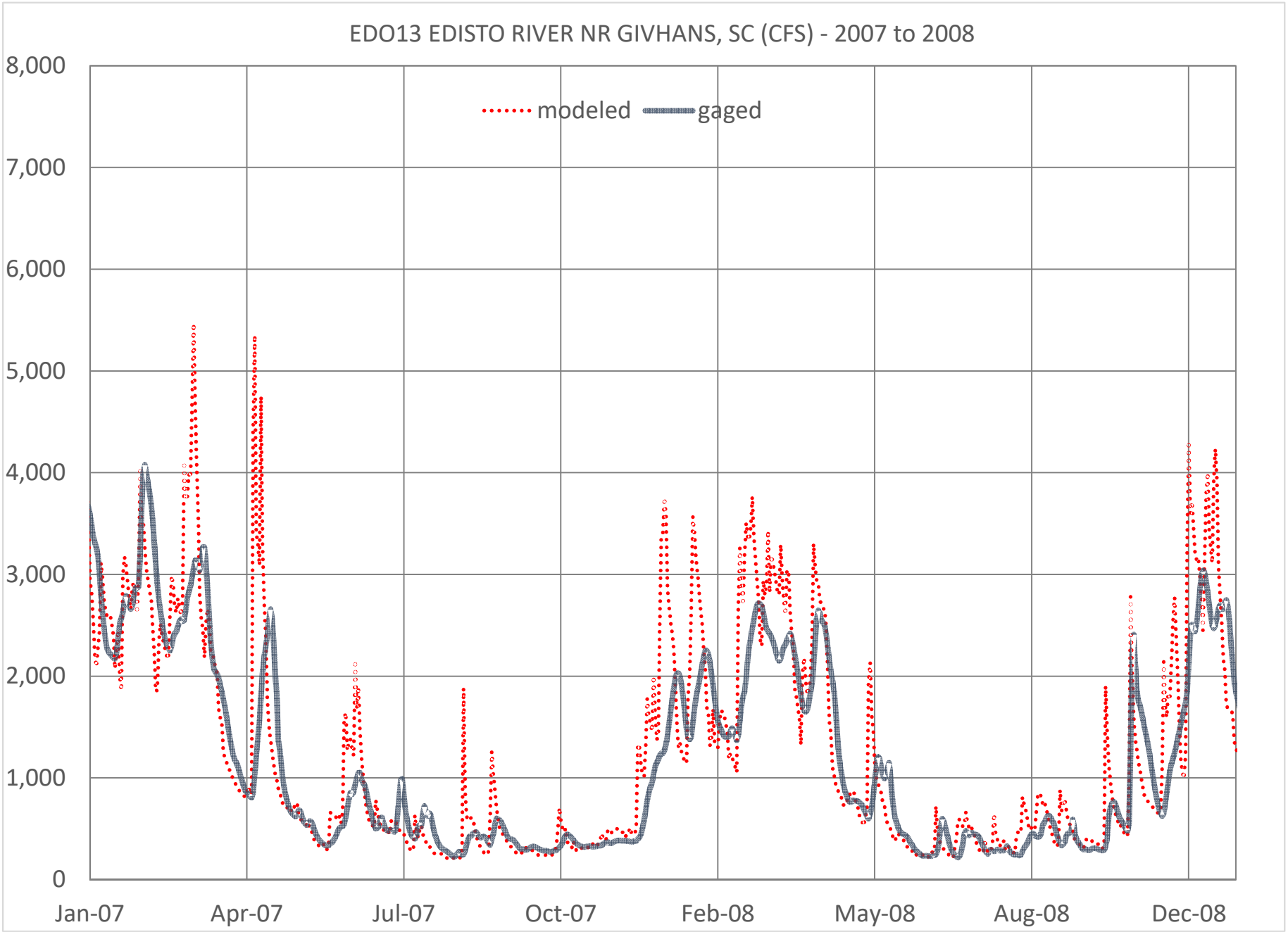

EDO11 EDISTO RIVER NEAR BRANCHVILLE, SC
Daily Flow Percentiles (CFS)
16000
14000
12000
10000
8000
6000
4000
2000
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

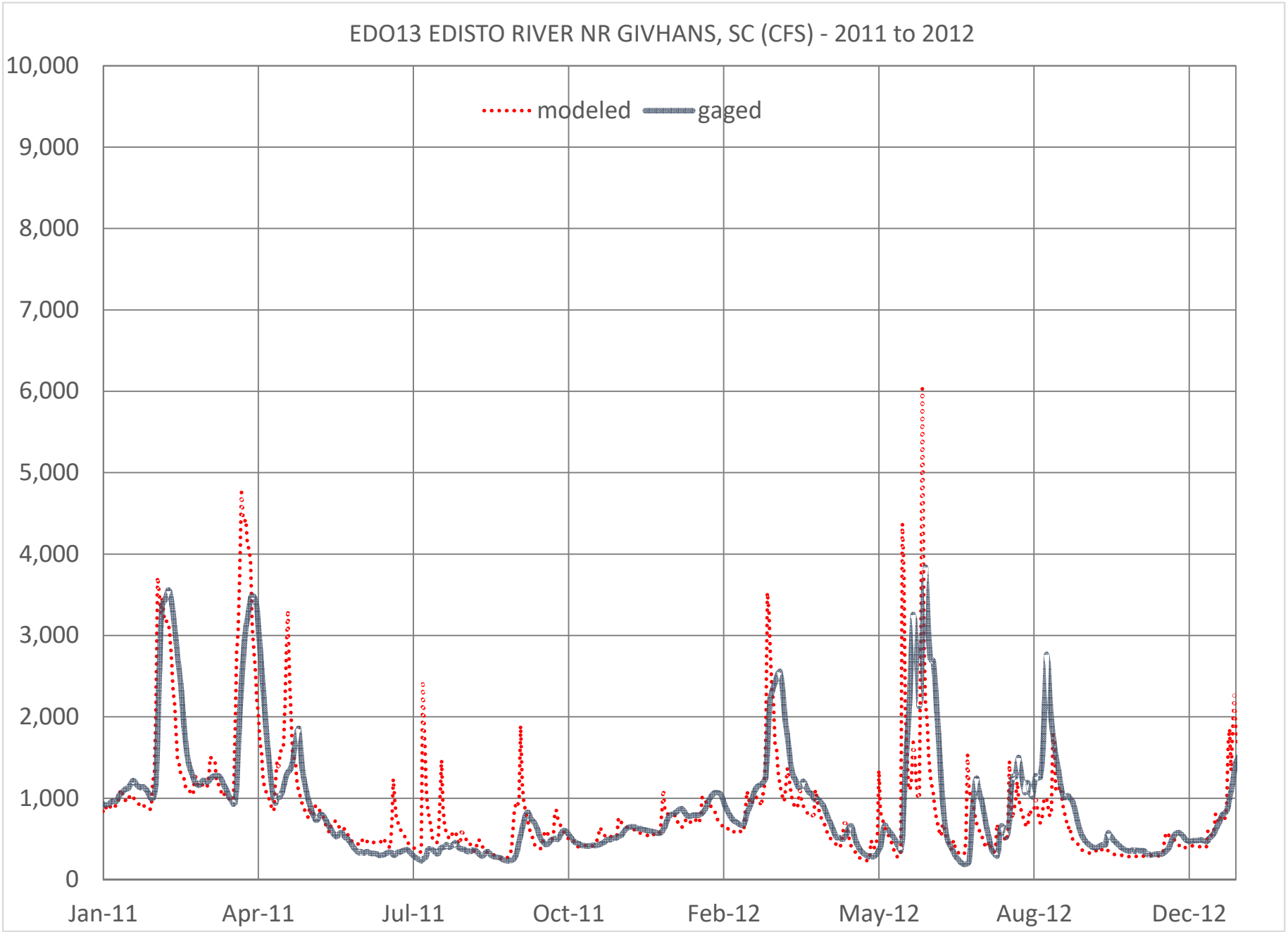

EDO12 COW CASTLE CREEK NEAR BOWMAN, SC (CFS)
1,200
1,000
800
600
400
200
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10

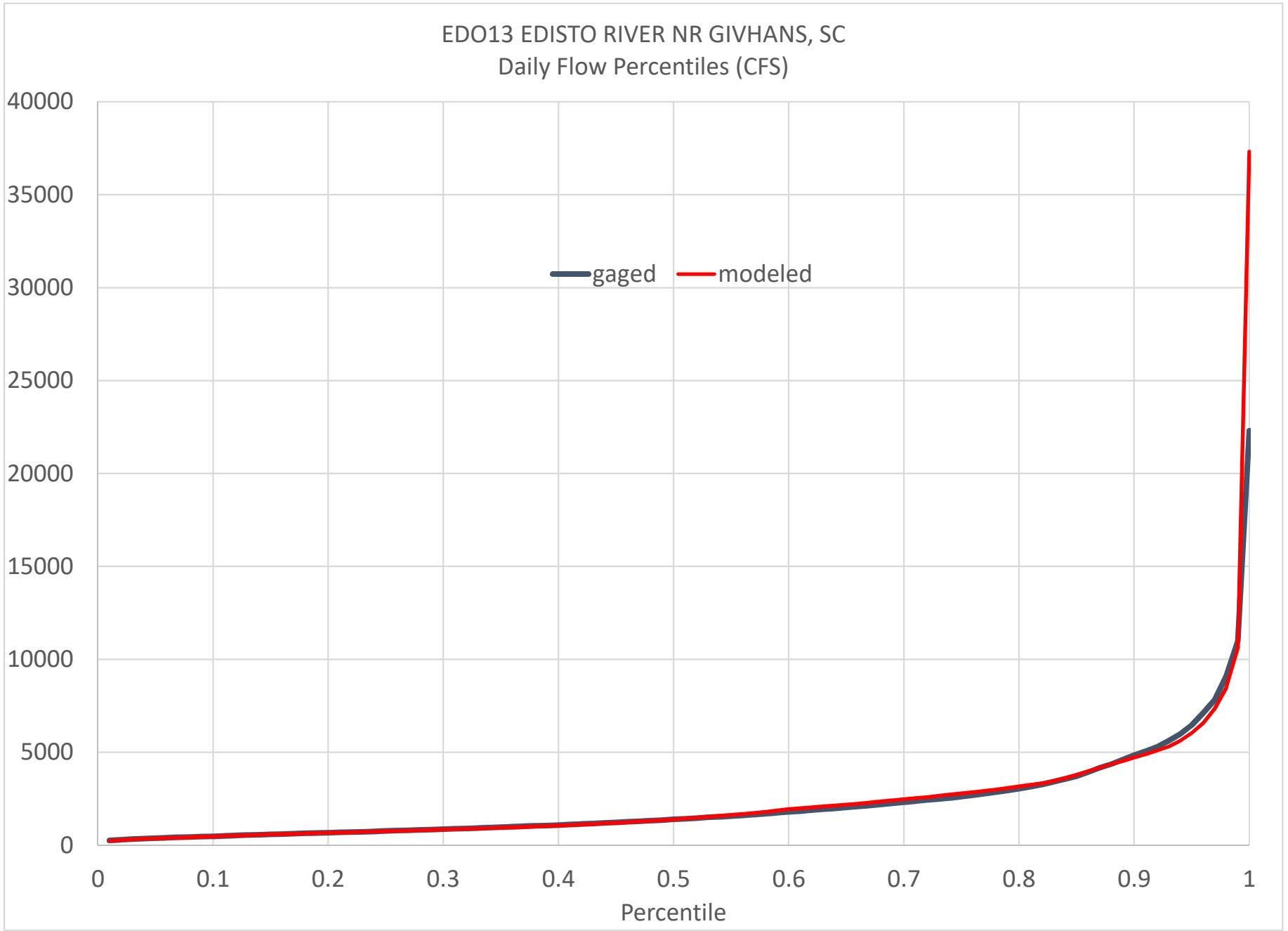

EDO12 COW CASTLE CREEK NEAR BOWMAN, SC
Daily Flow Percentiles (CFS)
1200
1000
800
600
400
200
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

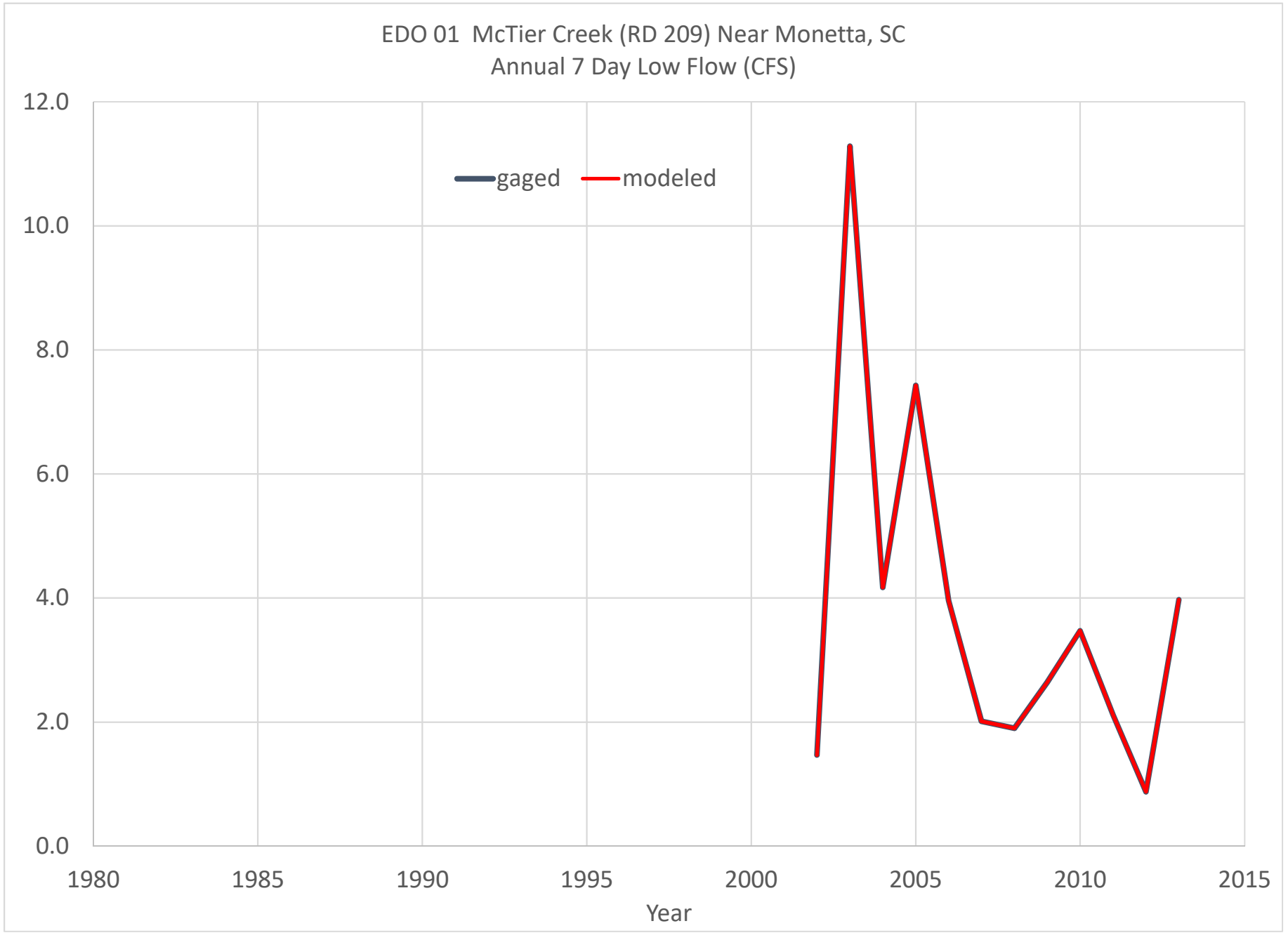

EDO13 EDISTO RIVER NR GIVHANS, SC (CFS)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
modeled
gaged
Jan-83
Jul-88
Dec-93
Jun-99
Dec-04
Jun-10
Nov-15

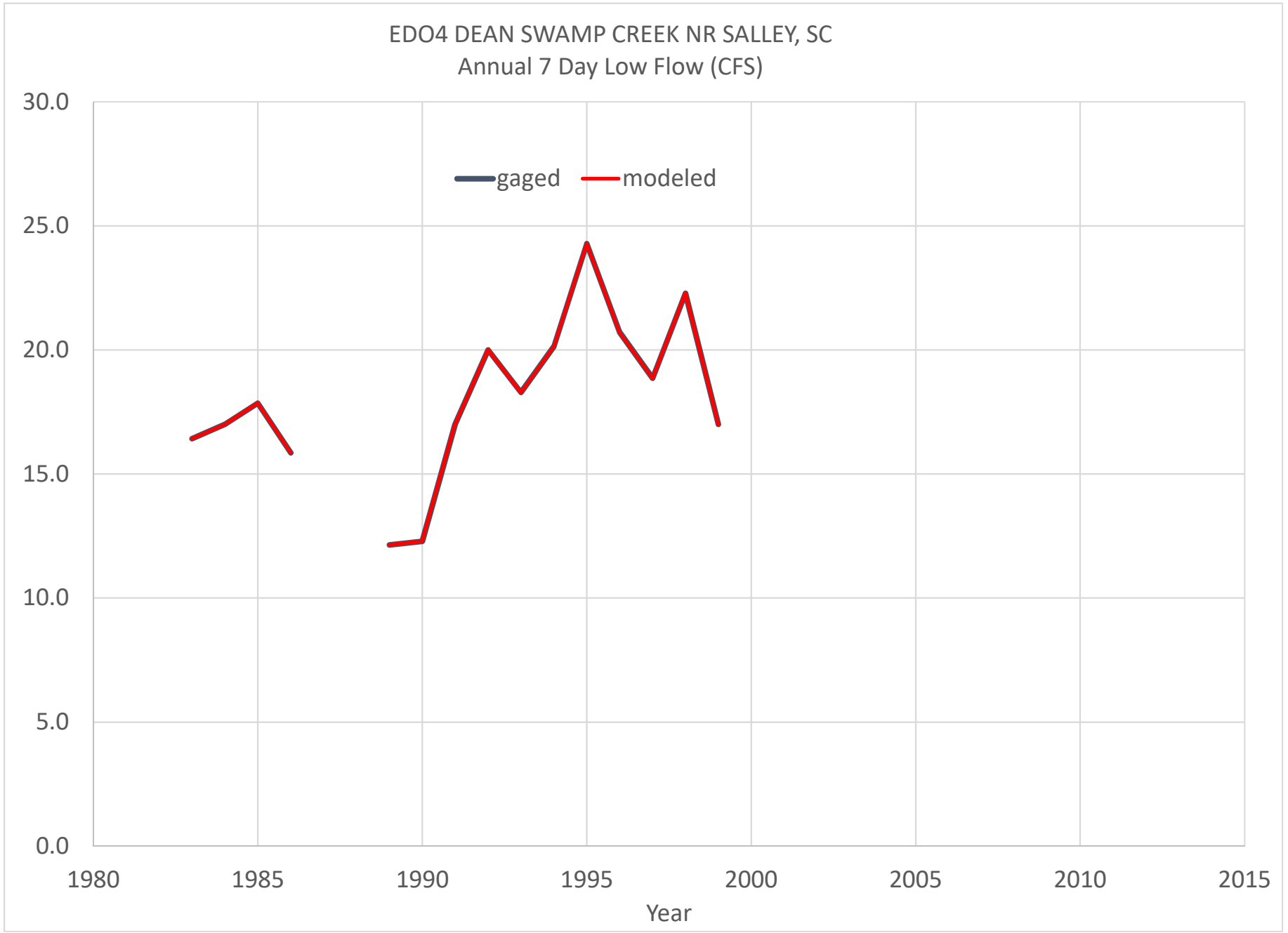

EDO13 EDISTO RIVER NR GIVHANS, SC (CFS) - 1998 to 2002
modeled
gaged
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-98
Jul-98
Feb-99
Aug-99
Mar-00
Sep-00
Apr-01
Nov-01
May-02
Dec-02

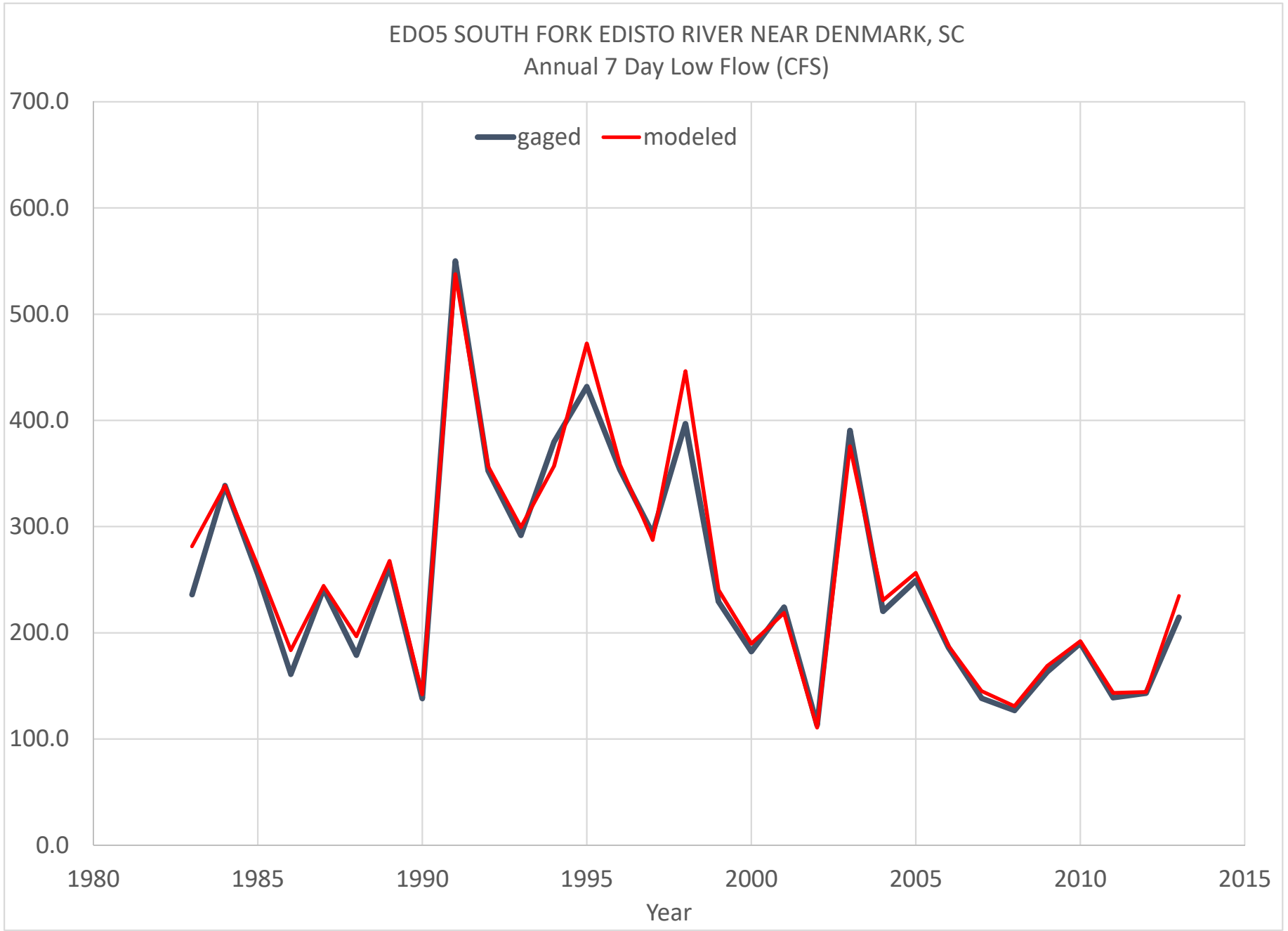

EDO13 EDISTO RIVER NR GIVHANS, SC (CFS) - 2007 to 2008
modeled
gaged
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-07
Apr-07
Jul-07
Oct-07
Feb-08
May-08
Aug-08
Dec-08

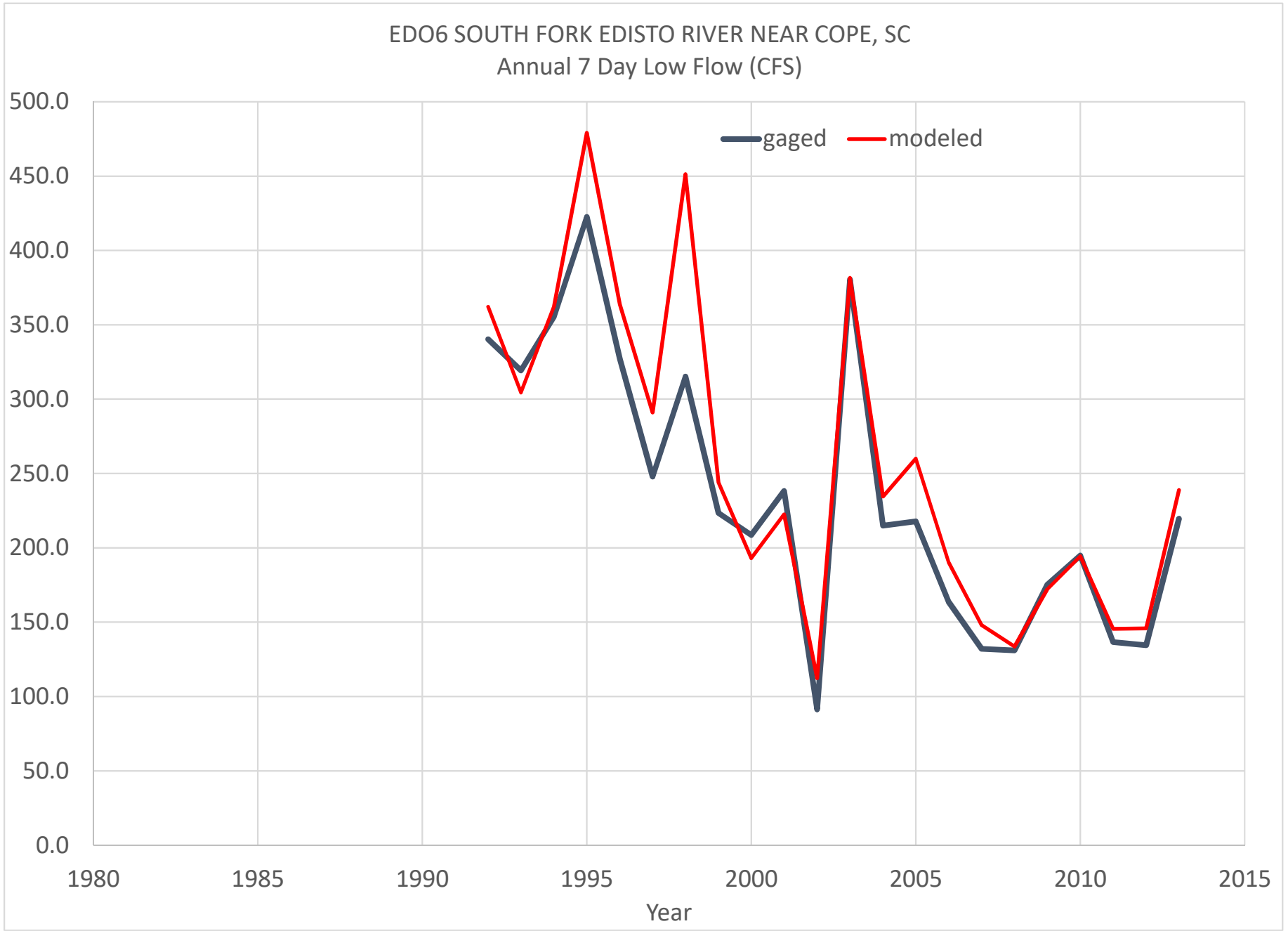

EDO13 EDISTO RIVER NR GIVHANS, SC (CFS) - 2011 to 2012
modeled
gaged
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-11
Apr-11
Jul-11
Oct-11
Feb-12
May-12
Aug-12
Dec-12

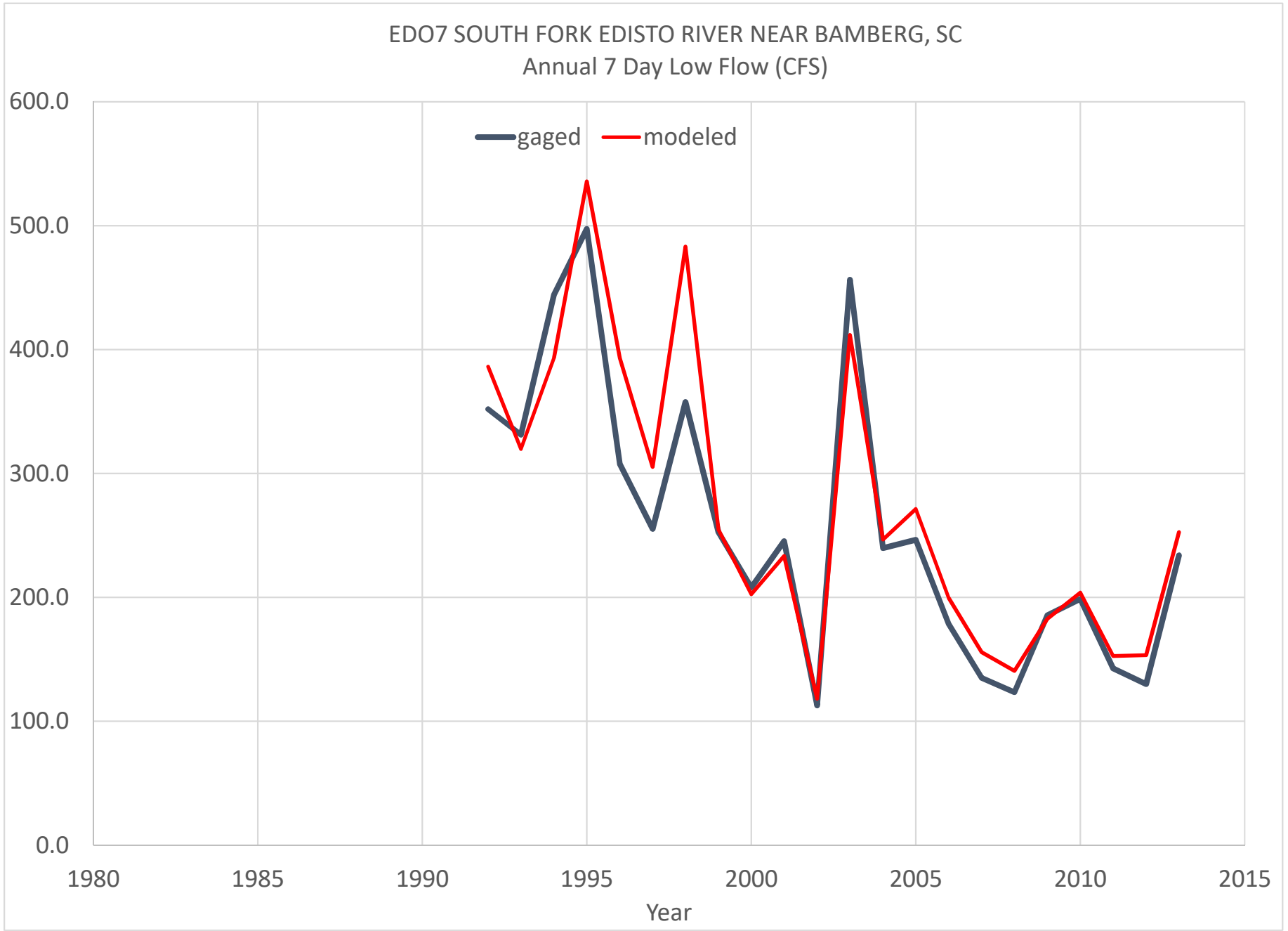

EDO13 EDISTO RIVER NR GIVHANS, SC
Daily Flow Percentiles (CFS)
40000
35000
30000
25000
20000
15000
10000
5000
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

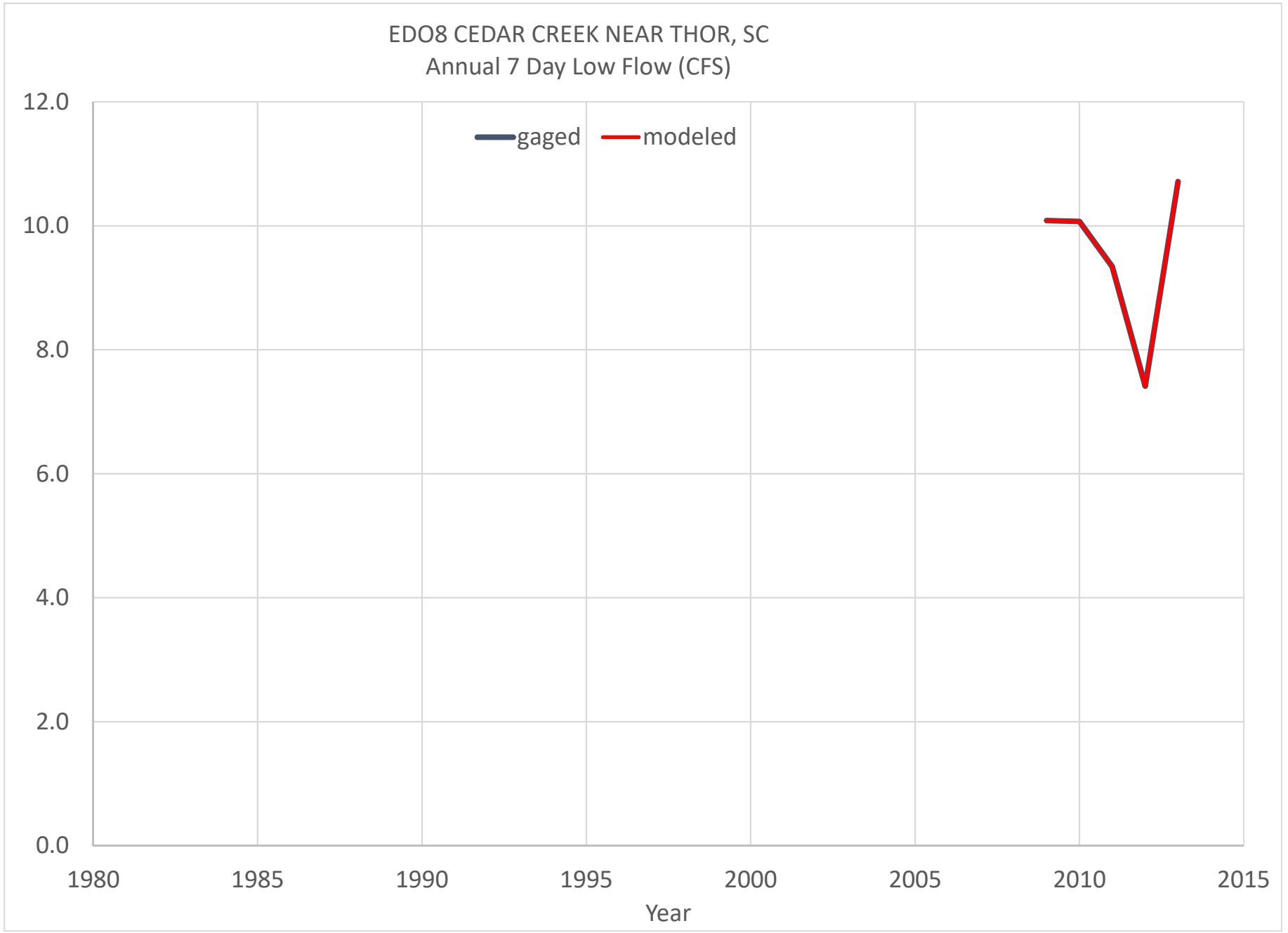

EDO 01 McTier Creek (RD 209) Near Monetta, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year

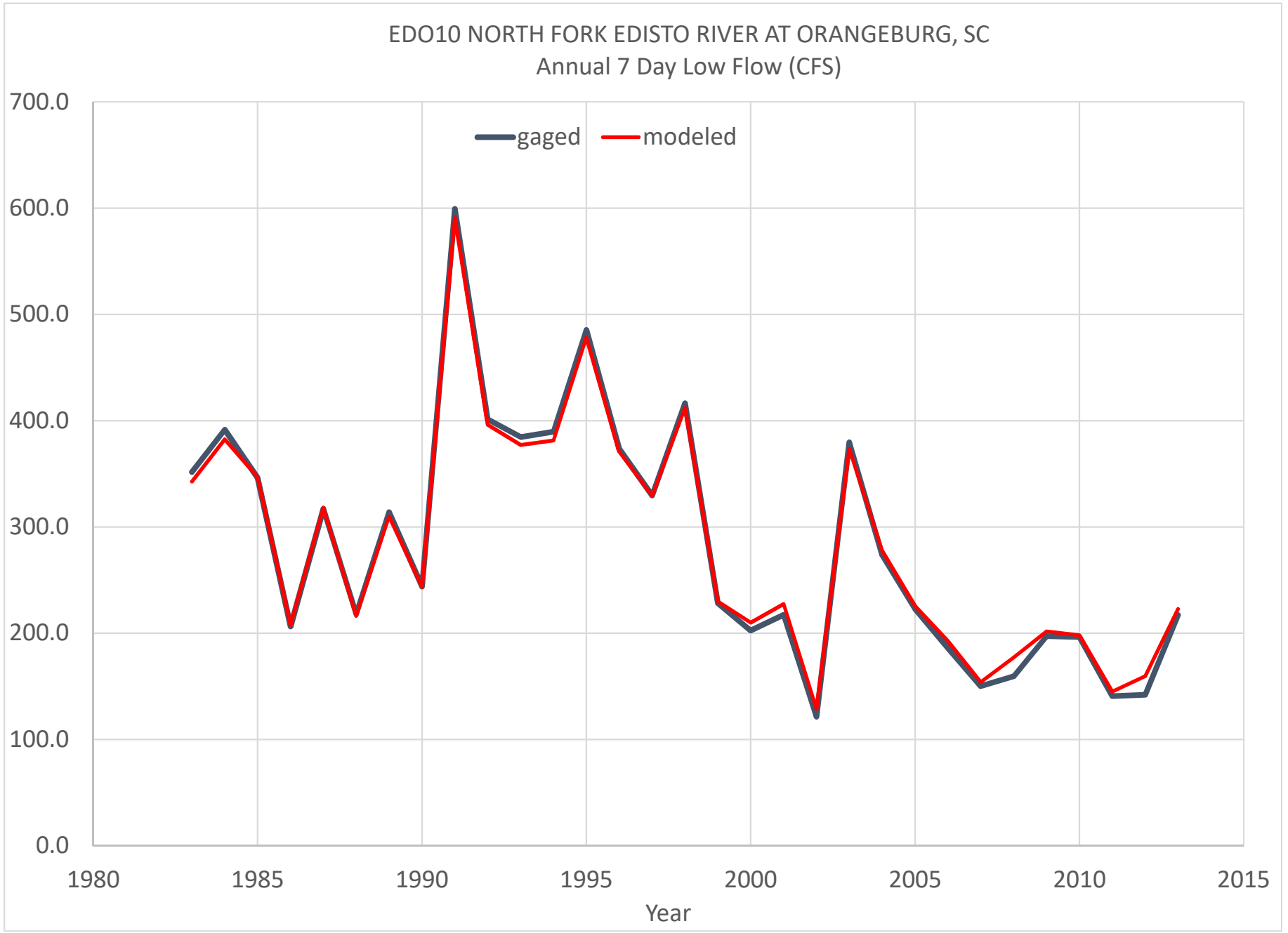

EDO4 DEAN SWAMP CREEK NR SALLEY, SC
Annual 7 Day Low Flow (CFS)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
gaged
modeled
1980
1985
1990
1995
2000
2005
2010
2015
Year

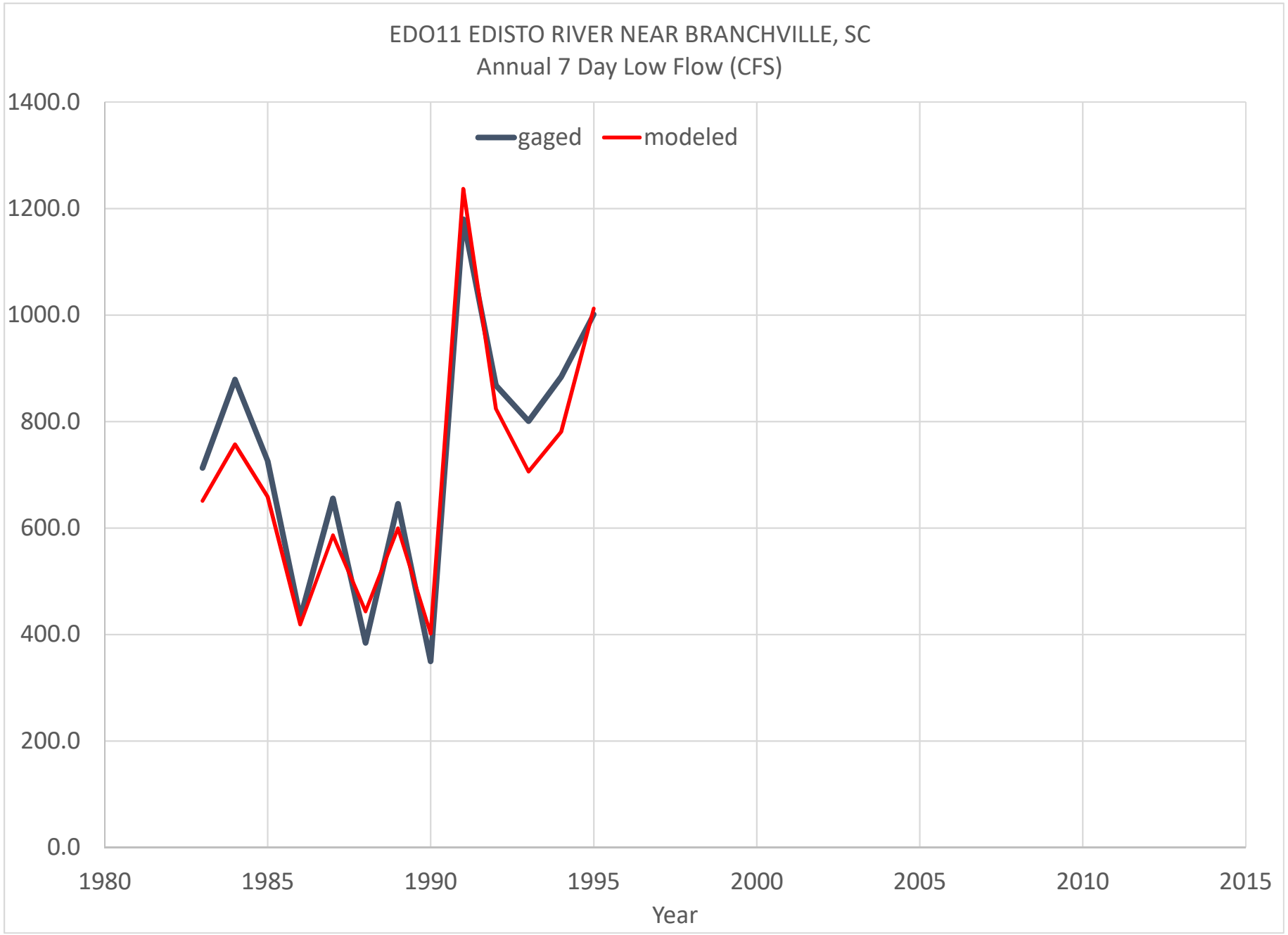

EDO5 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year

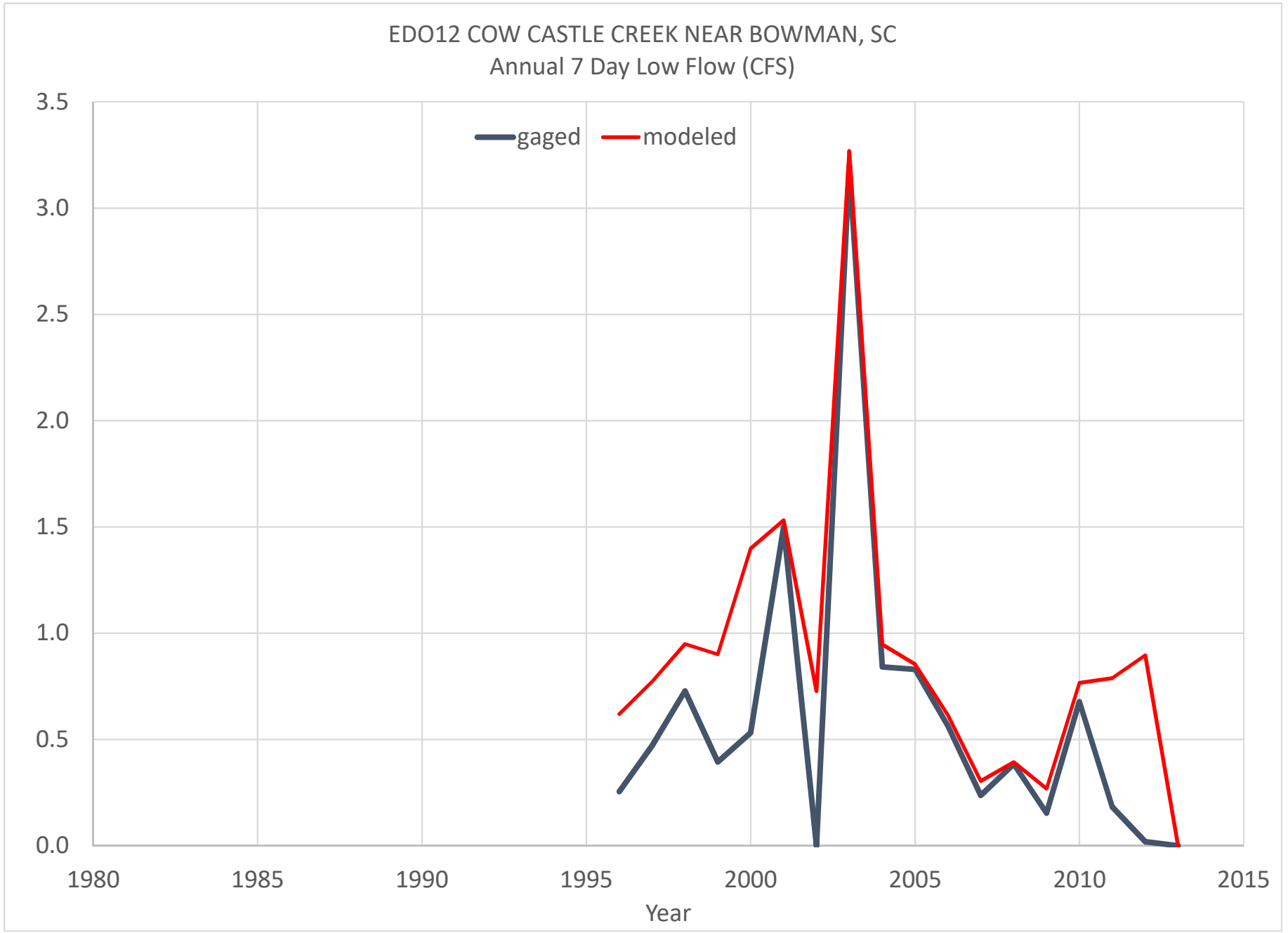

EDO6 SOUTH FORK EDISTO RIVER NEAR COPE, SC
Annual 7 Day Low Flow (CFS)
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
gaged
modeled
1980
1985
1990
1995
2000
2005
2010
2015
Year

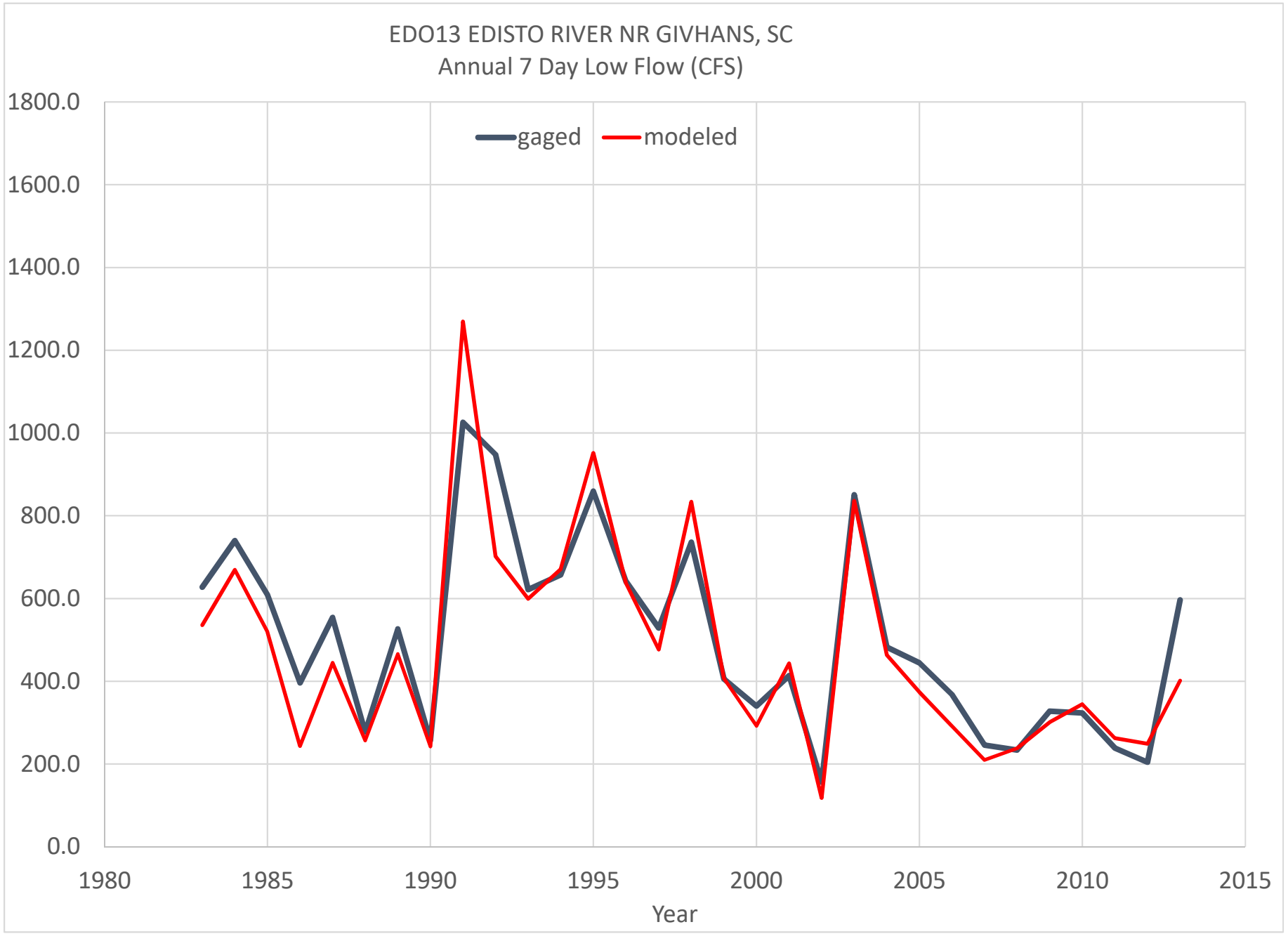

EDO7 SOUTH FORK EDISTO RIVER NEAR BAMBERG, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
600.0
500.0
400.0
300.0
200.0
100.0
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year


EDO8 CEDAR CREEK NEAR THOR, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year


EDO10 NORTH FORK EDISTO RIVER AT ORANGEBURG, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year


EDO11 EDISTO RIVER NEAR BRANCHVILLE, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year


EDO12 COW CASTLE CREEK NEAR BOWMAN, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year


EDO13 EDISTO RIVER NR GIVHANS, SC
Annual 7 Day Low Flow (CFS)
gaged
modeled
1800.0
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
1980
1985
1990
1995
2000
2005
2010
2015
Year

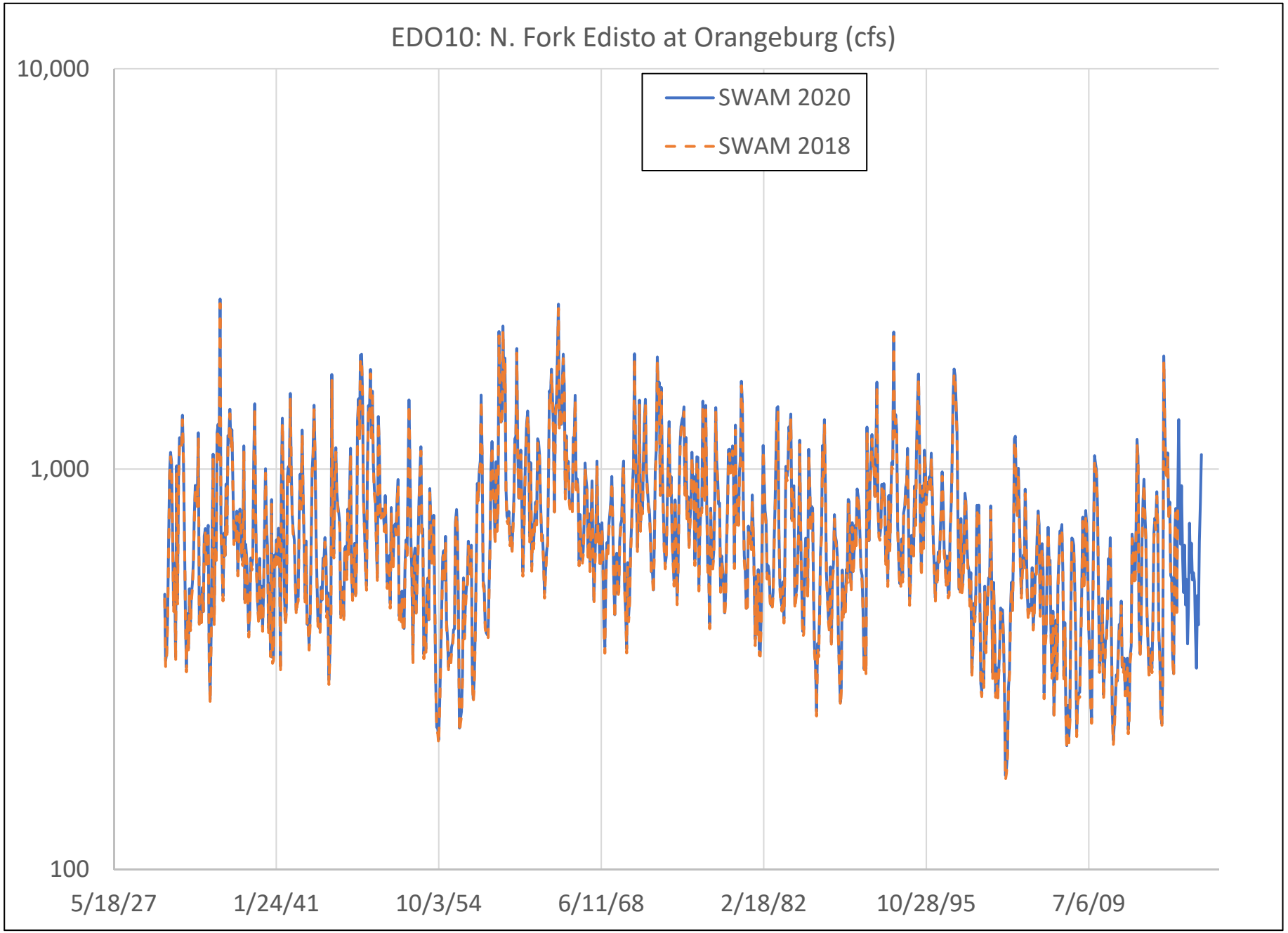
2020 Edisto SWAM Model Updates

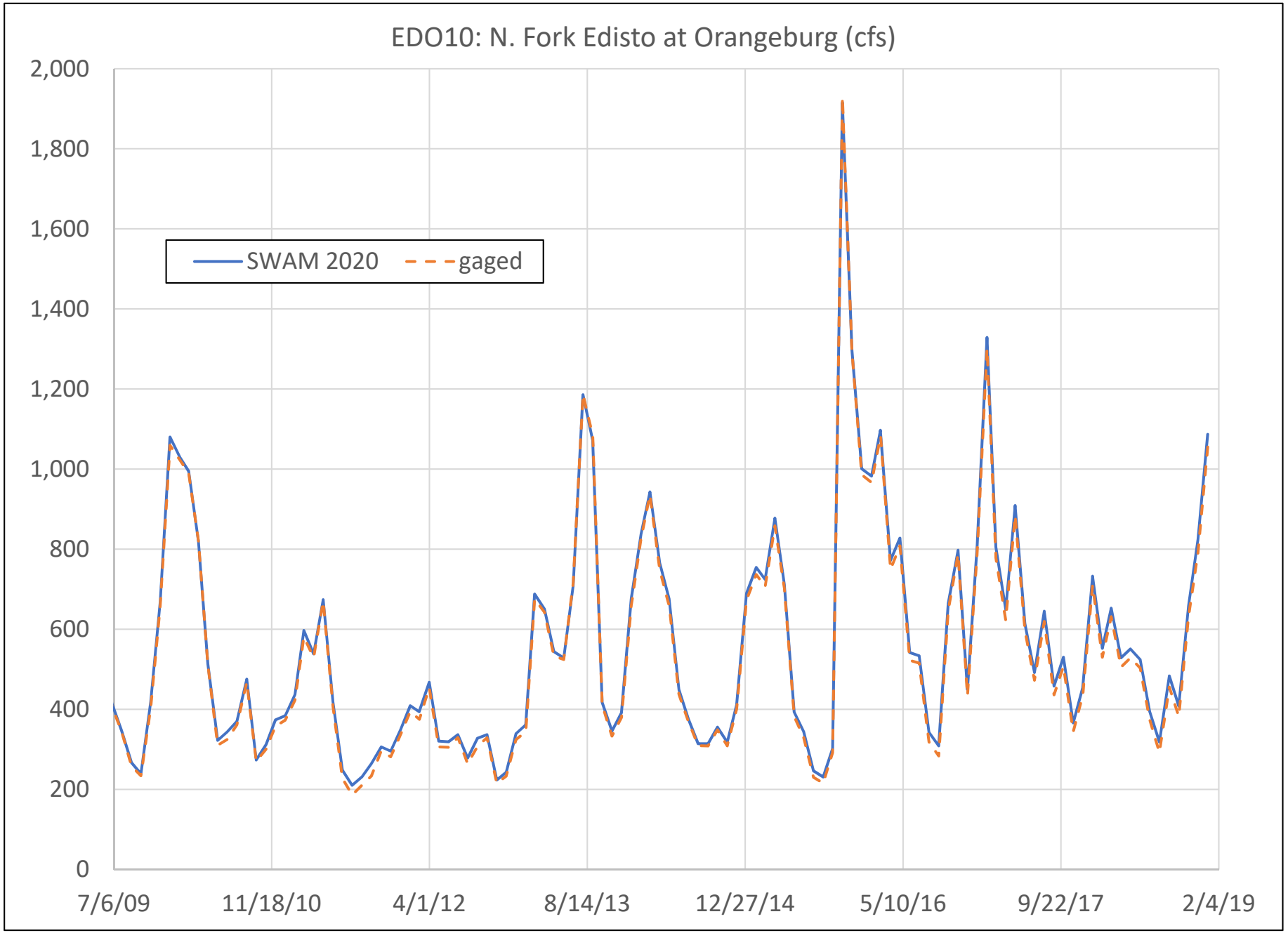
Attachment C

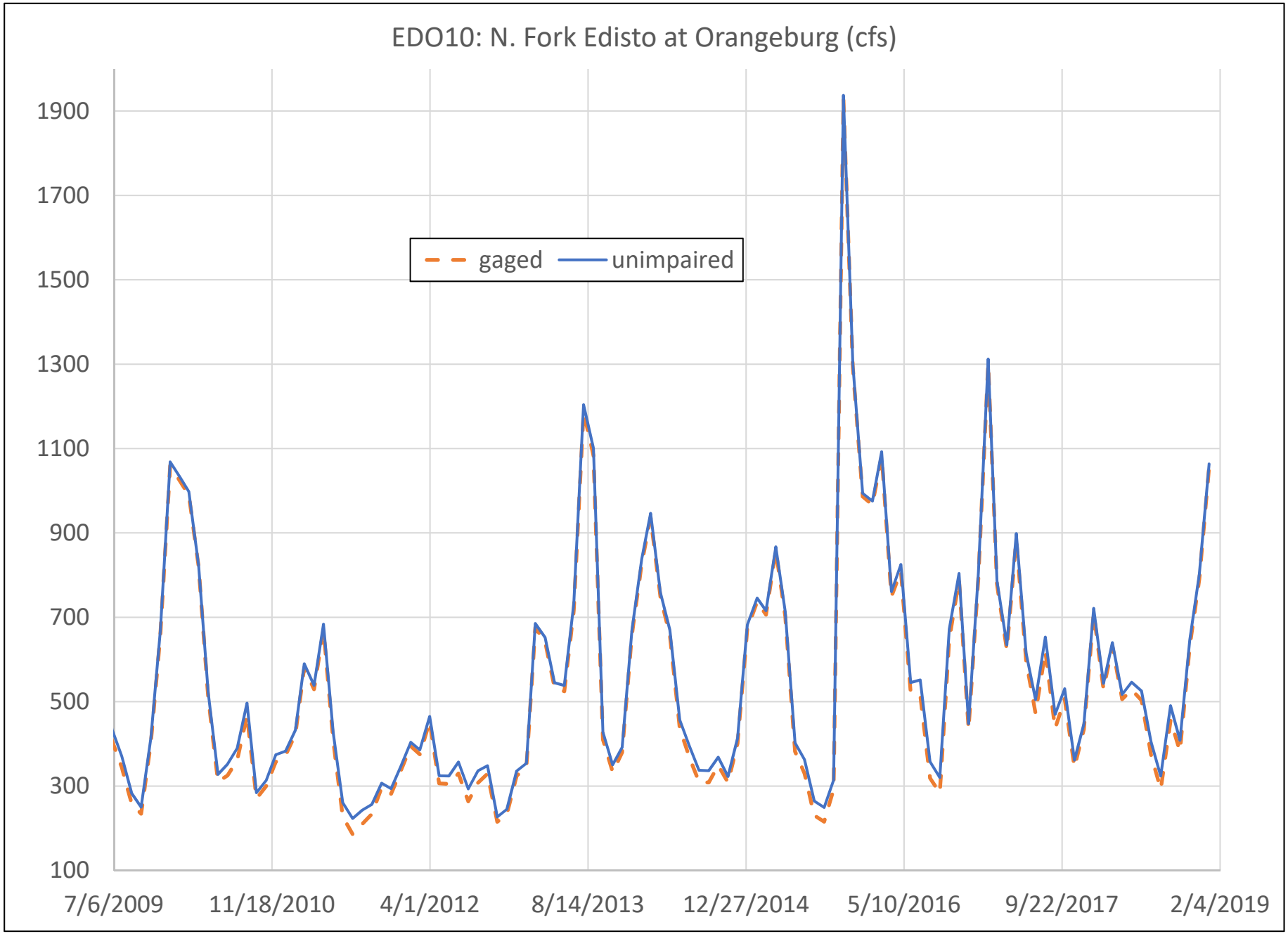
Validation Results

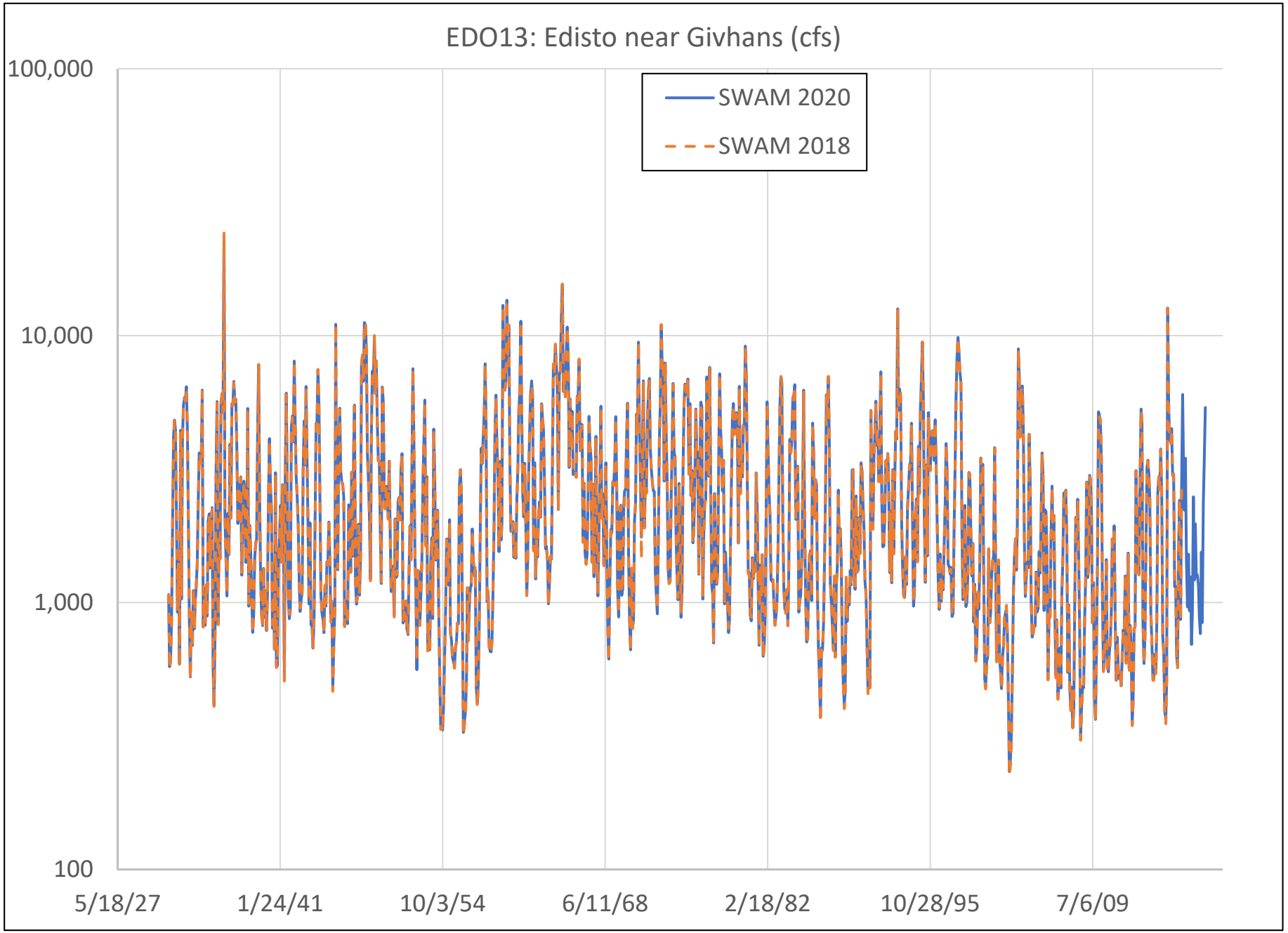
Attachment C

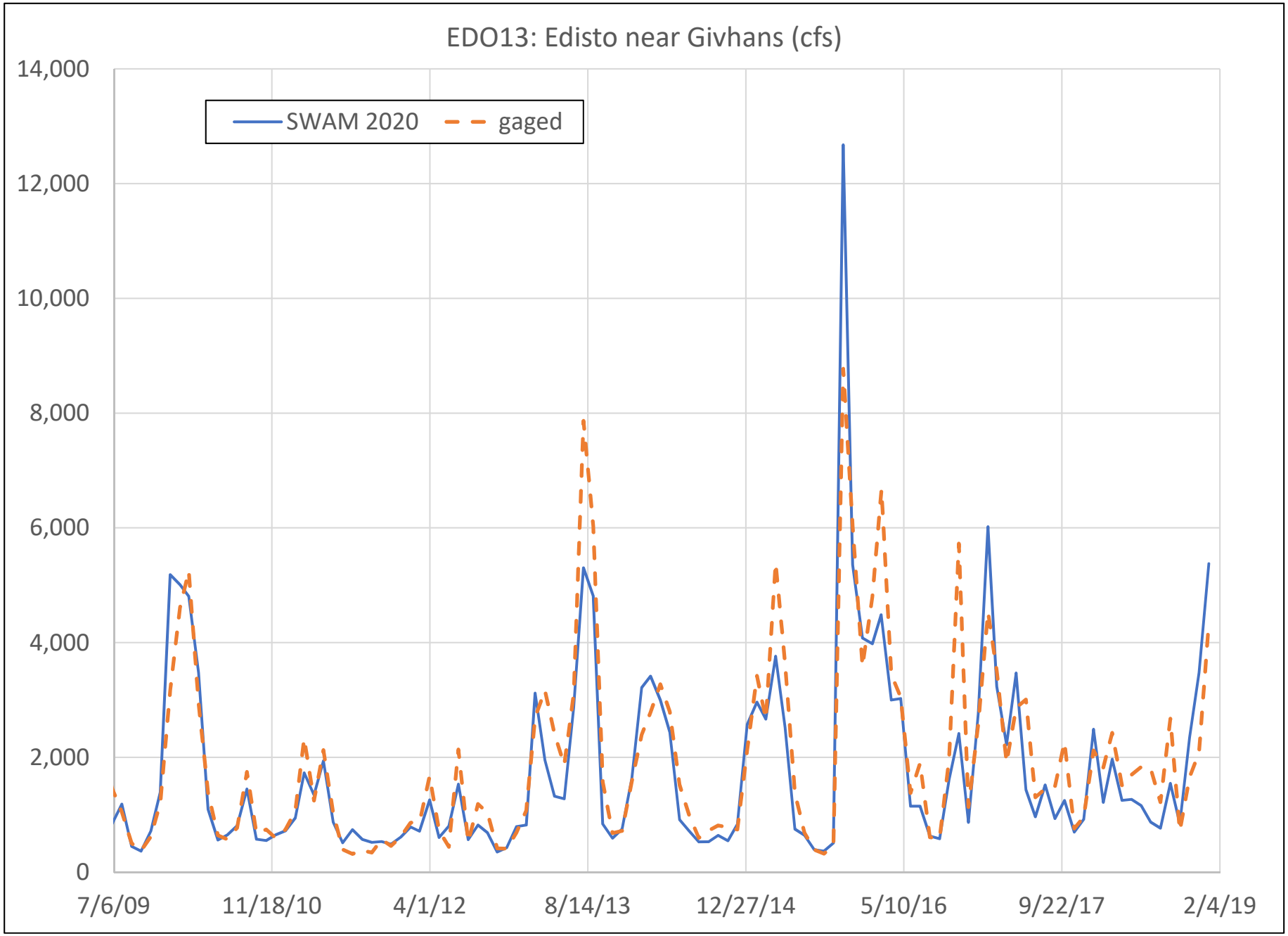
Monthly Validation Results

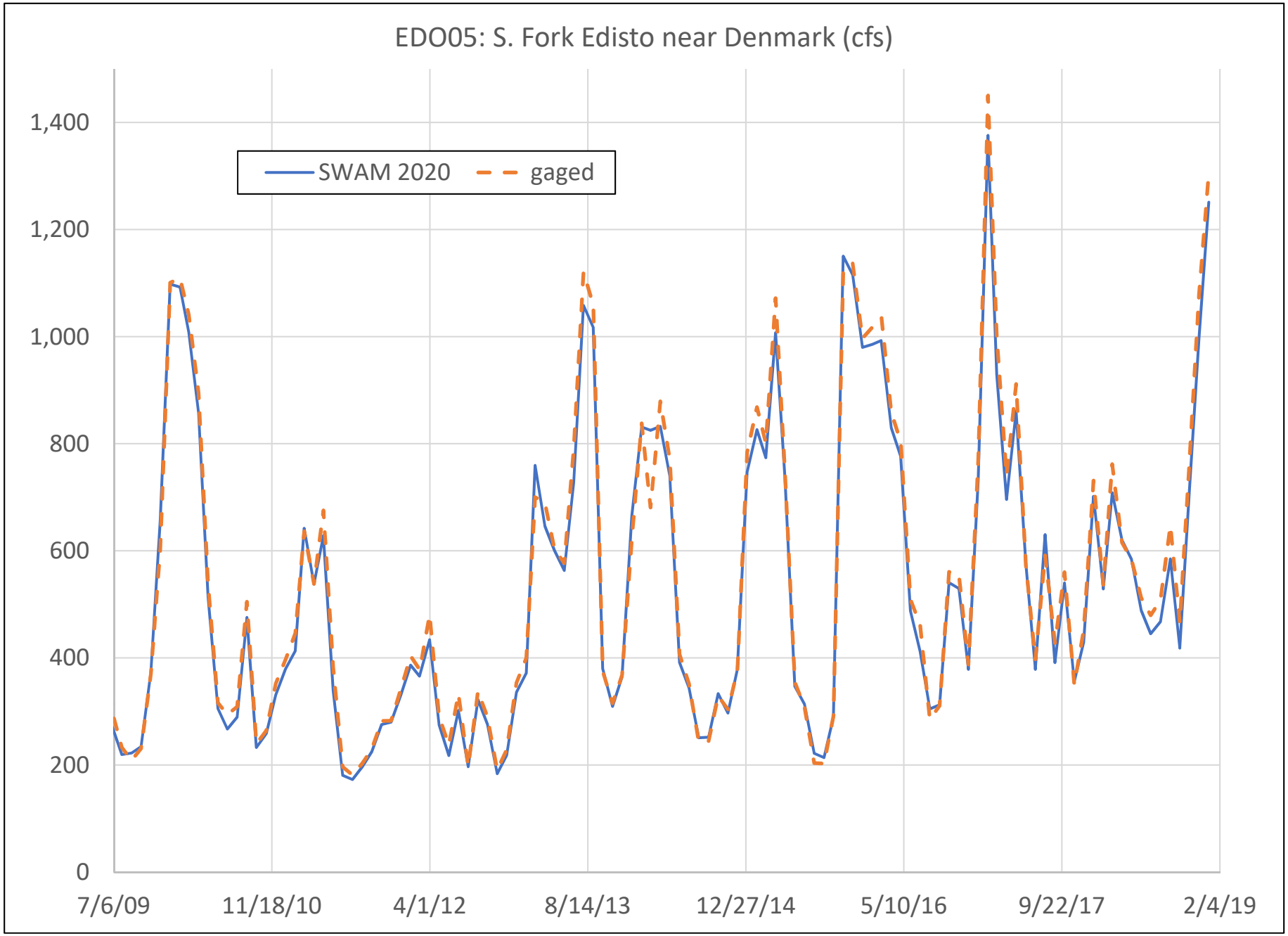

EDO10: N. Fork Edisto at Orangeburg (cfs)
10,000
1,000
100
SWAM 2020
SWAM 2018
5/18/27
1/24/41
10/3/54
6/11/68
2/18/82
10/28/95
7/6/09

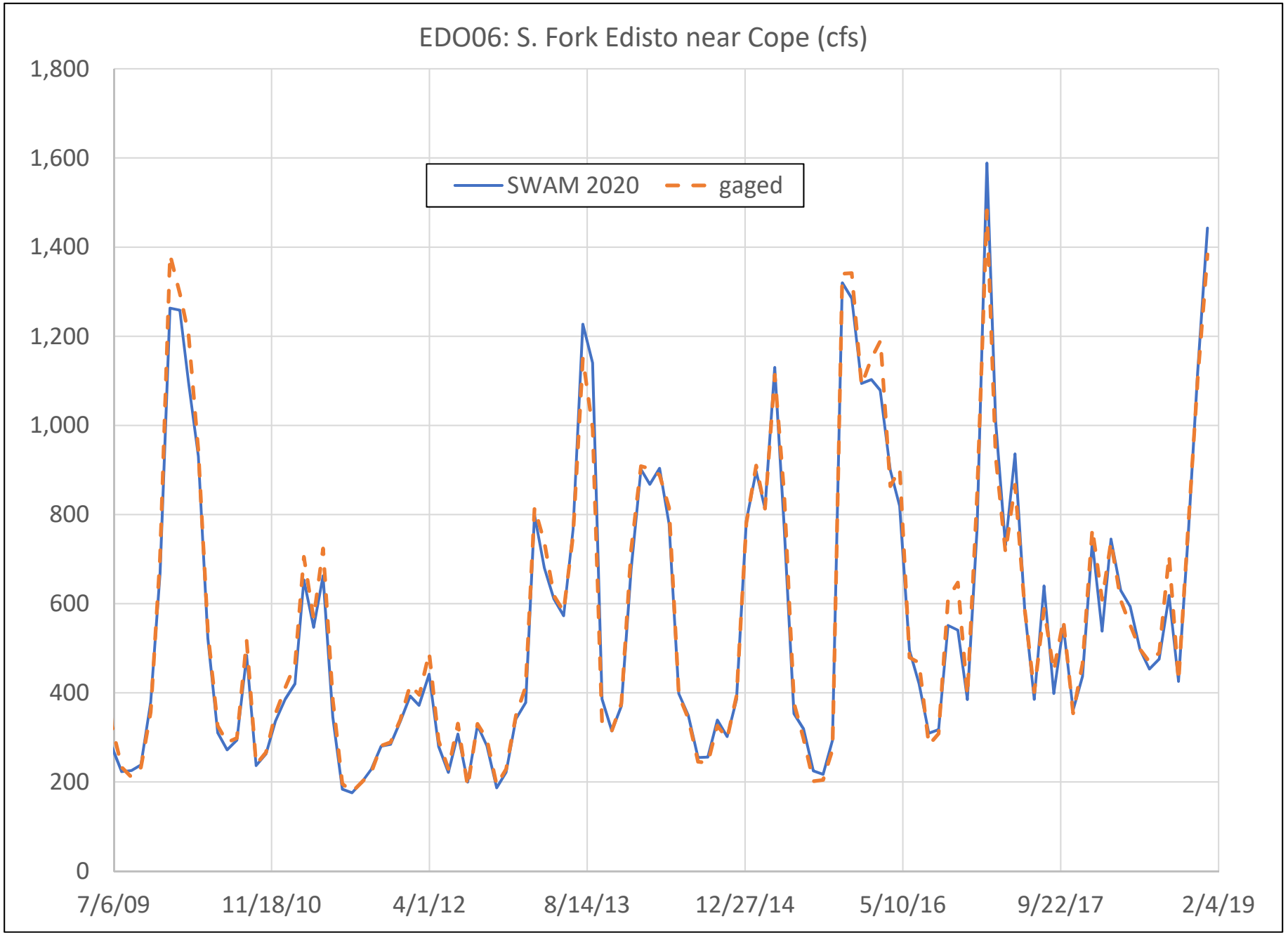

EDO10: N. Fork Edisto at Orangeburg (cfs)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
SWAM 2020
gaged
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19

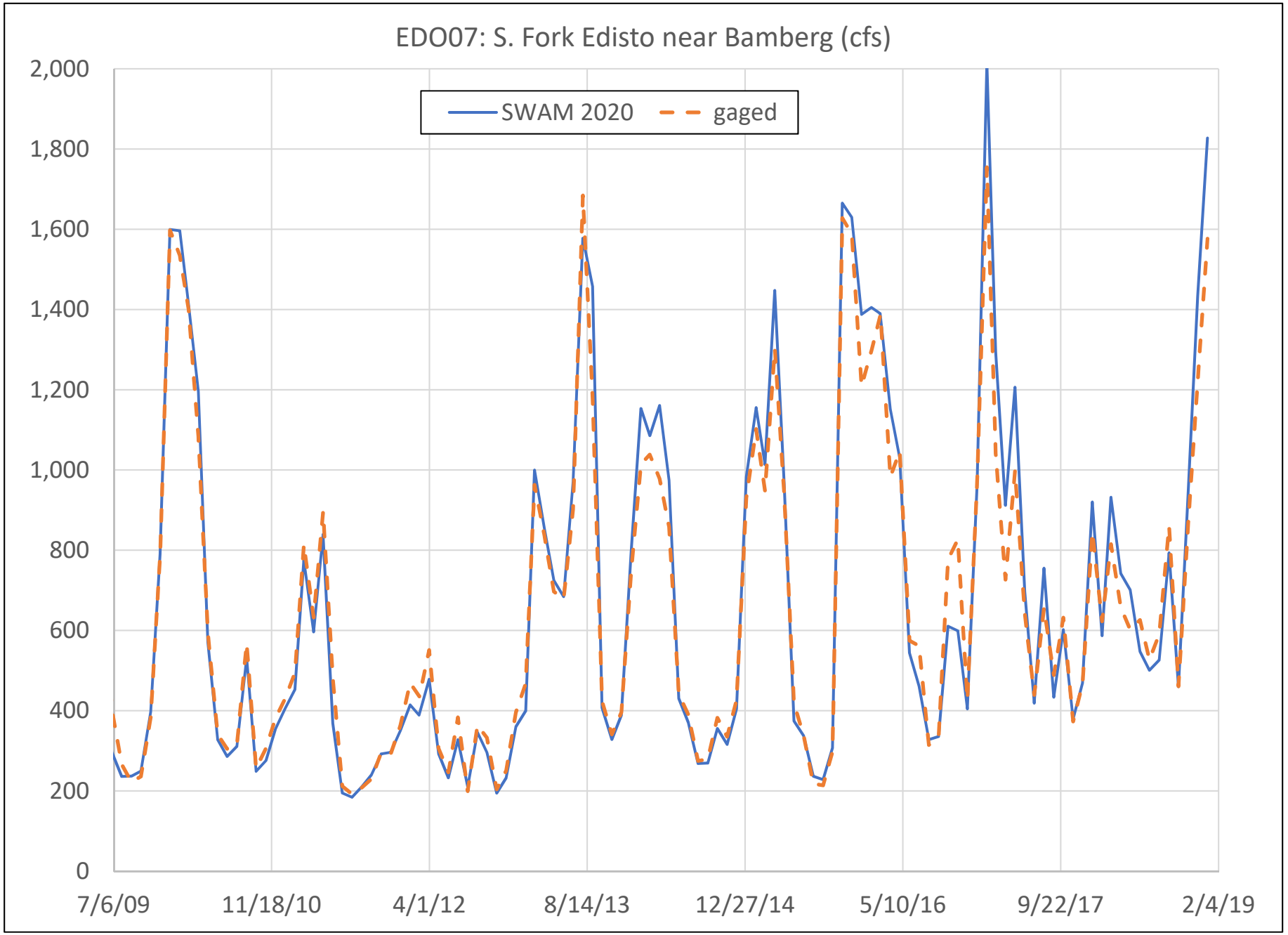

EDO10: N. Fork Edisto at Orangeburg (cfs)
gaged
unimpaired
1900
1700
1500
1300
1100
900
700
500
300
100
7/6/2009
11/18/2010
4/1/2012
8/14/2013
12/27/2014
5/10/2016
9/22/2017
2/4/2019

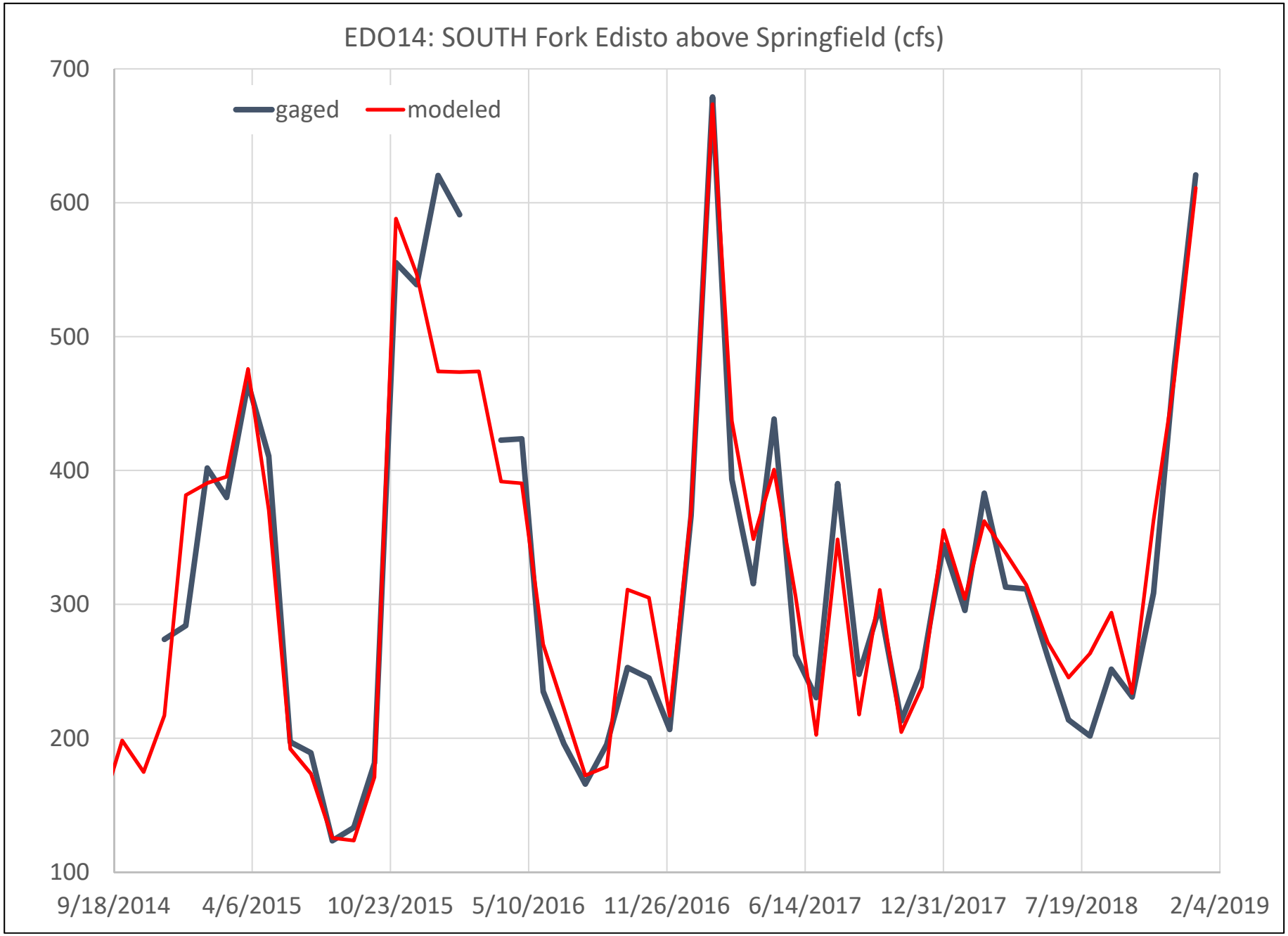

EDO13: Edisto near Givhans (cfs)
100,000
10,000
1,000
100
SWAM 2020
SWAM 2018
5/18/27
1/24/41
10/3/54
6/11/68
2/18/82
10/28/95
7/6/09

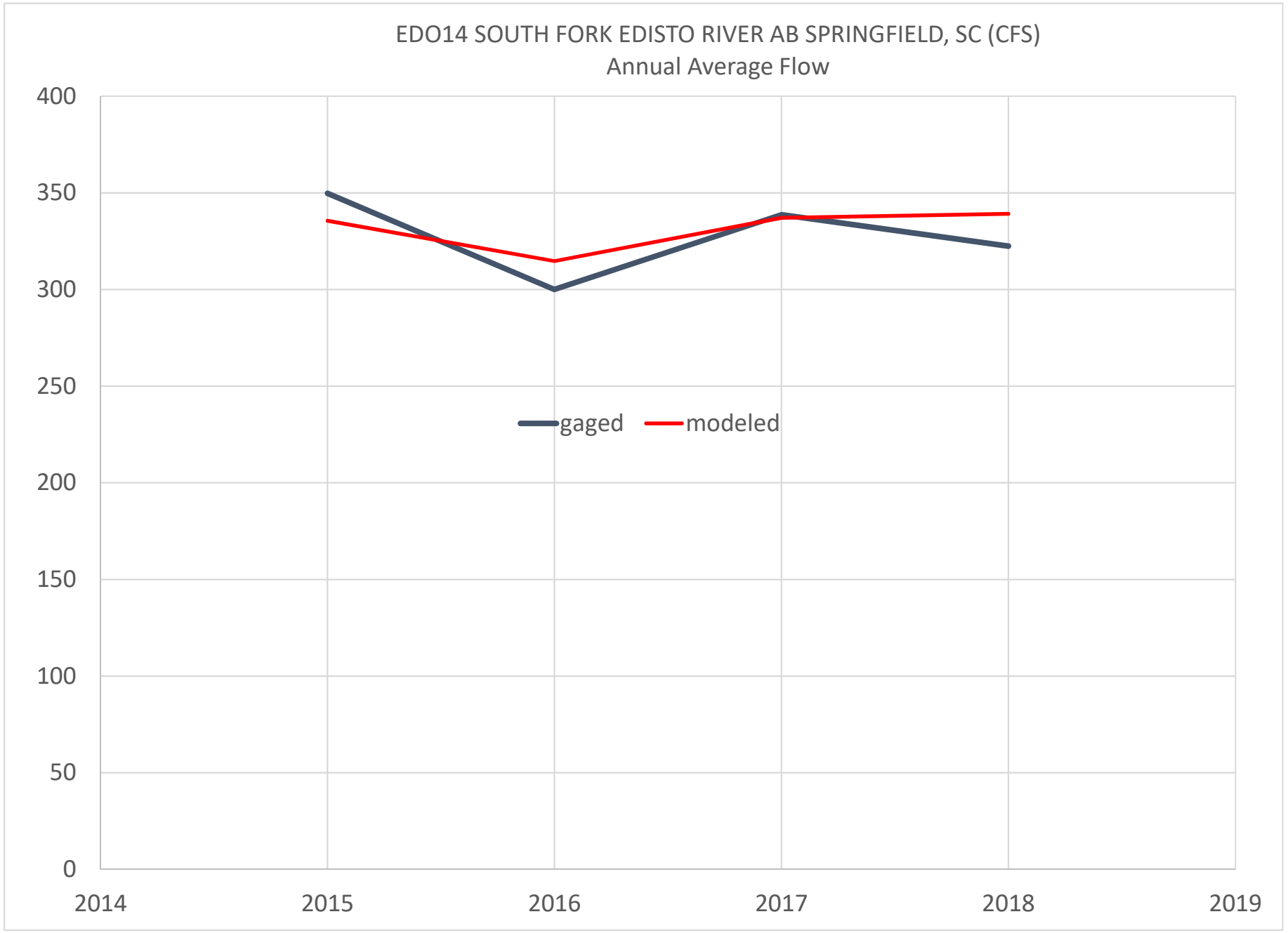

EDO13: Edisto near Givhans (cfs)
SWAM 2020
gaged
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19

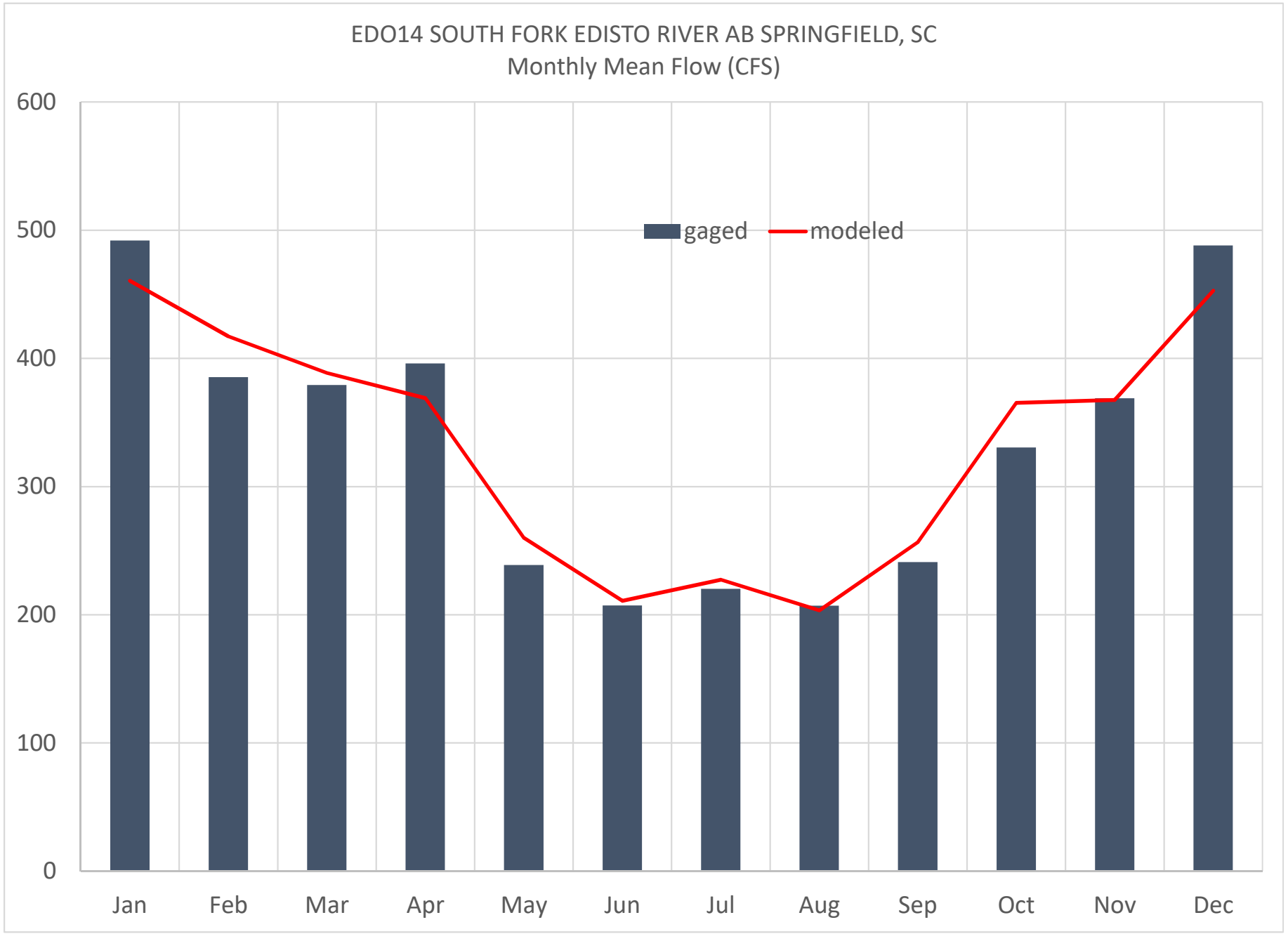

EDO05: S. Fork Edisto near Denmark (cfs)
SWAM 2020
gaged
1,400
1,200
1,000
800
600
400
200
0
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19

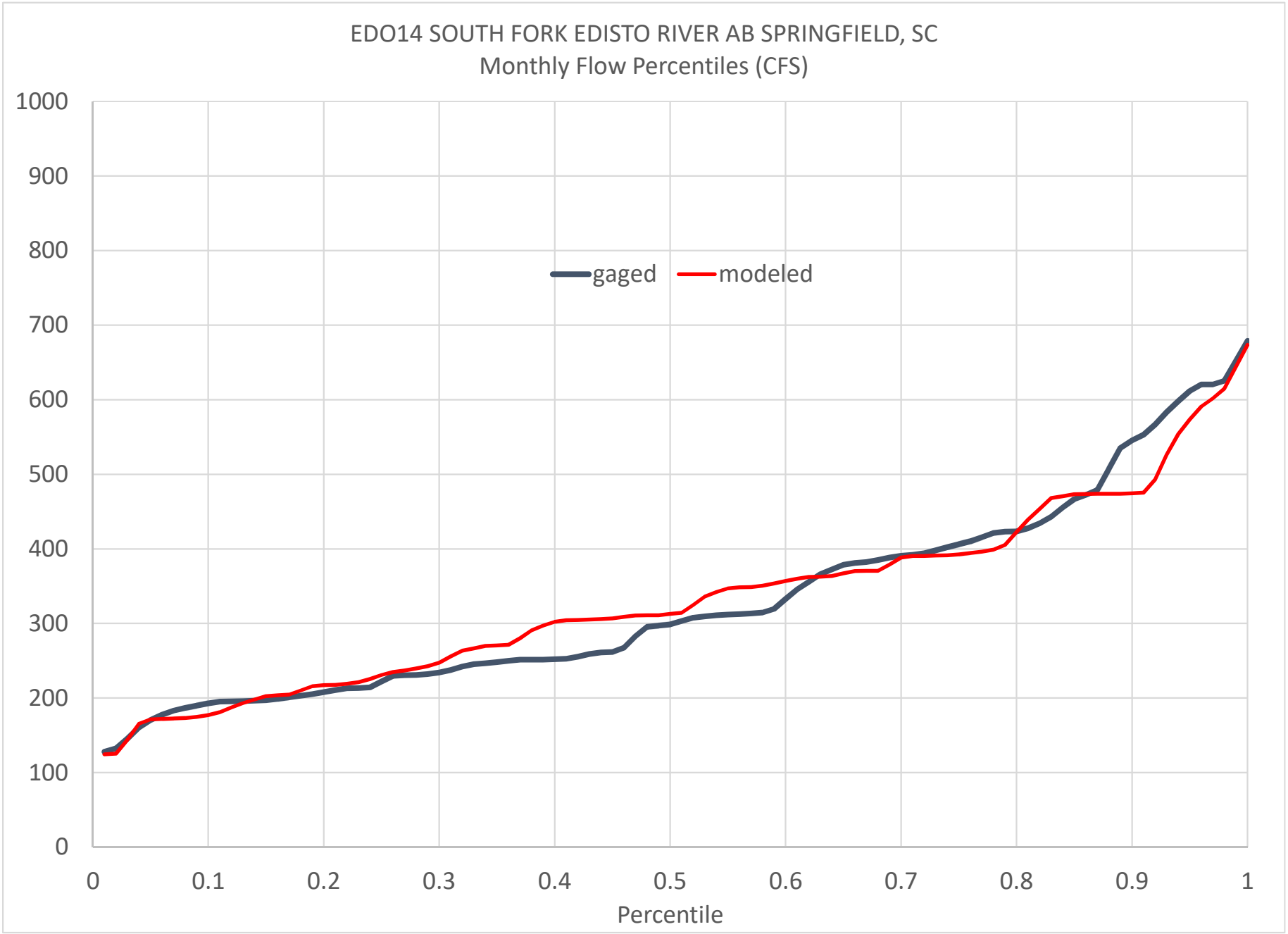

EDO06: S. Fork Edisto near Cope (cfs)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
SWAM 2020
gaged
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19


EDO07: S. Fork Edisto near Bamberg (cfs)
SWAM 2020
gaged
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19


EDO14: SOUTH Fork Edisto above Springfield (cfs)
gaged
modeled
700
600
500
400
300
200
100
9/18/2014
4/6/2015
10/23/2015
5/10/2016
11/26/2016
6/14/2017
12/31/2017
7/19/2018
2/4/2019

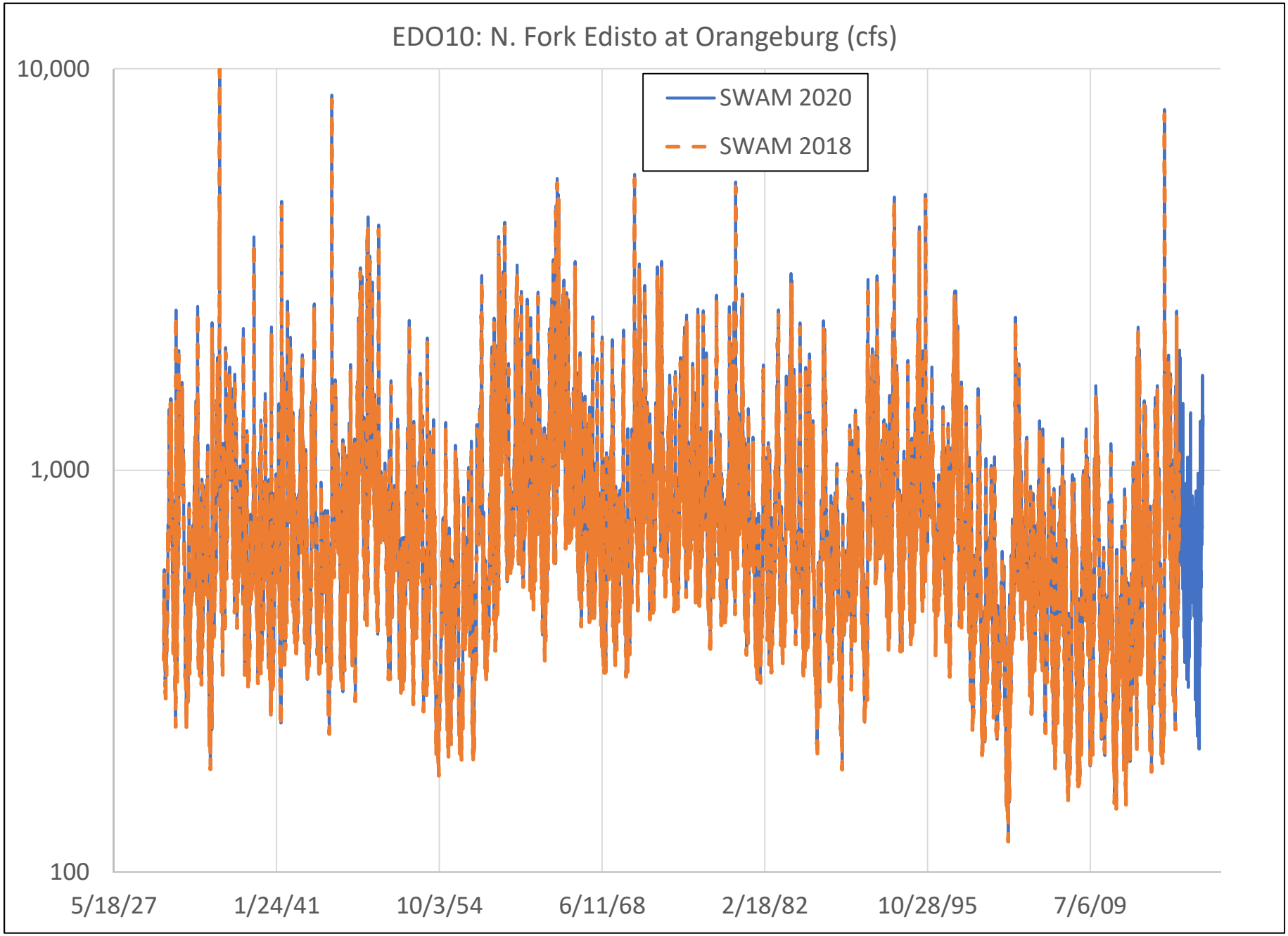

EDO14 SOUTH FORK EDISTO RIVER AB SPRINGFIELD, SC (CFS)
Annual Average Flow
400
350
300
250
200
150
100
50
0
2014
2015
2016
2017
2018
2019
gaged
modeled

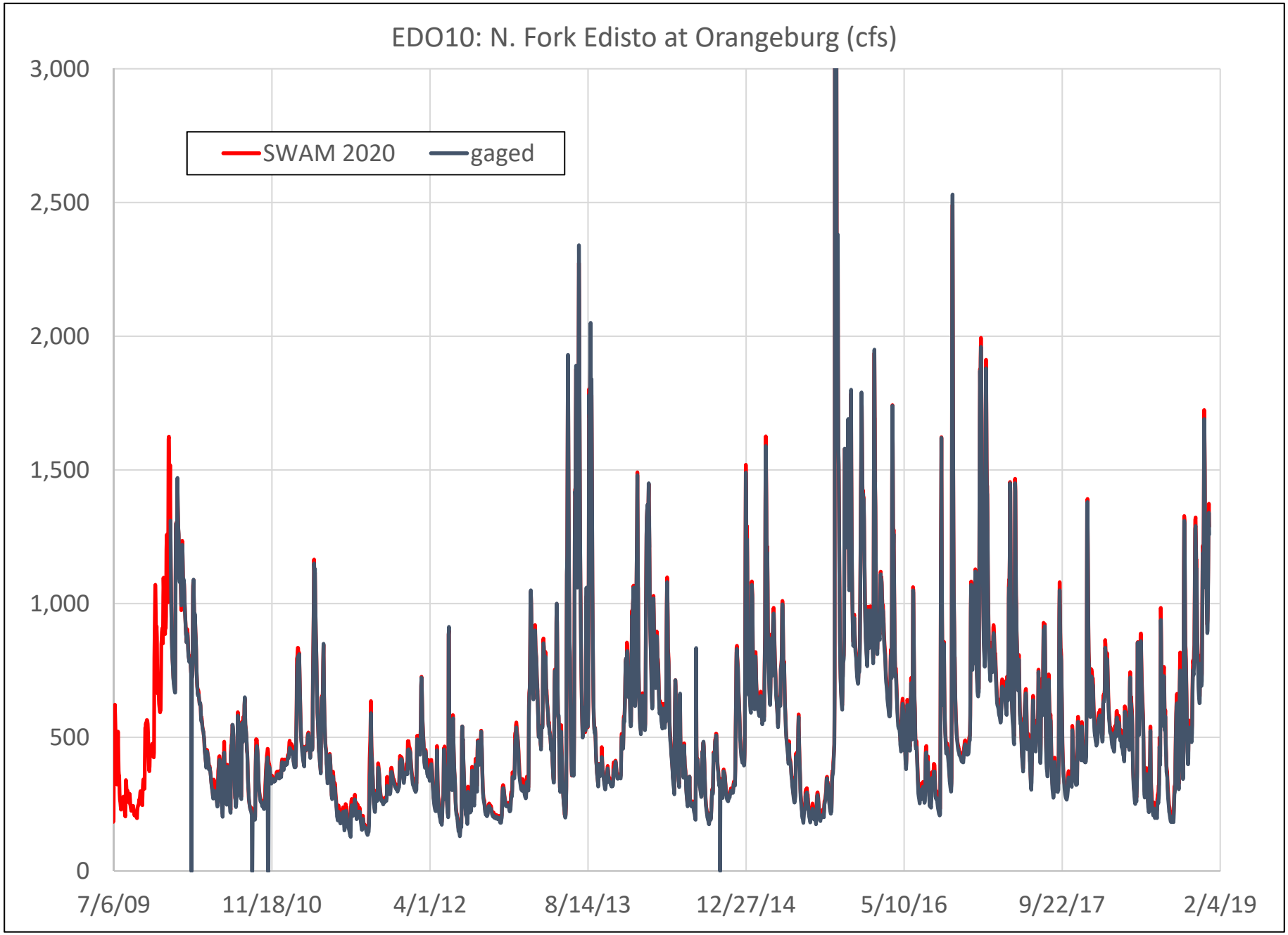

EDO14 SOUTH FORK EDISTO RIVER AB SPRINGFIELD, SC
Monthly Mean Flow (CFS)
600
500
400
300
200
100
0
gaged
modeled
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

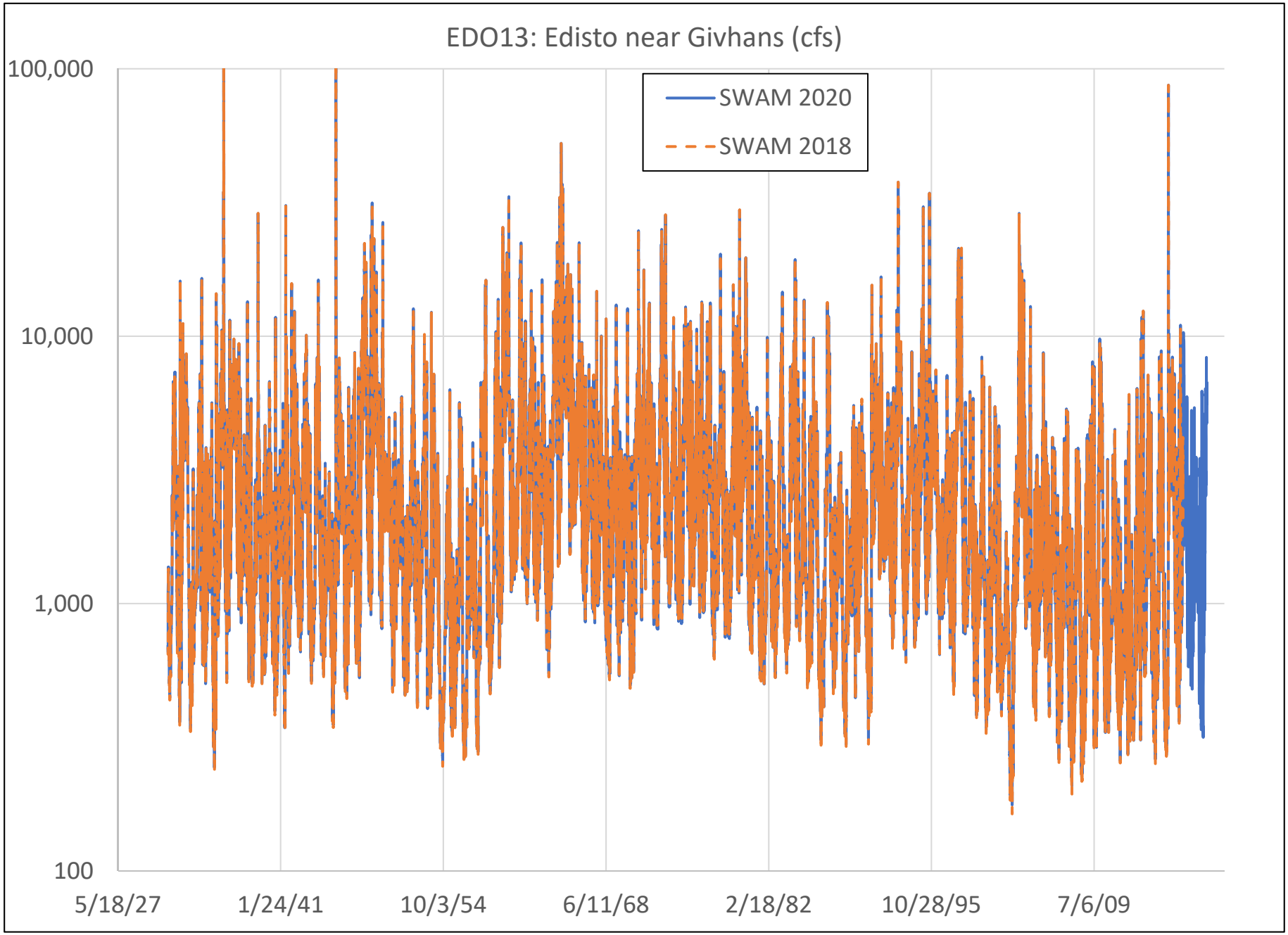

EDO14 SOUTH FORK EDISTO RIVER AB SPRINGFIELD, SC
Monthly Flow Percentiles (CFS)
1000
900
800
700
600
500
400
300
200
100
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile

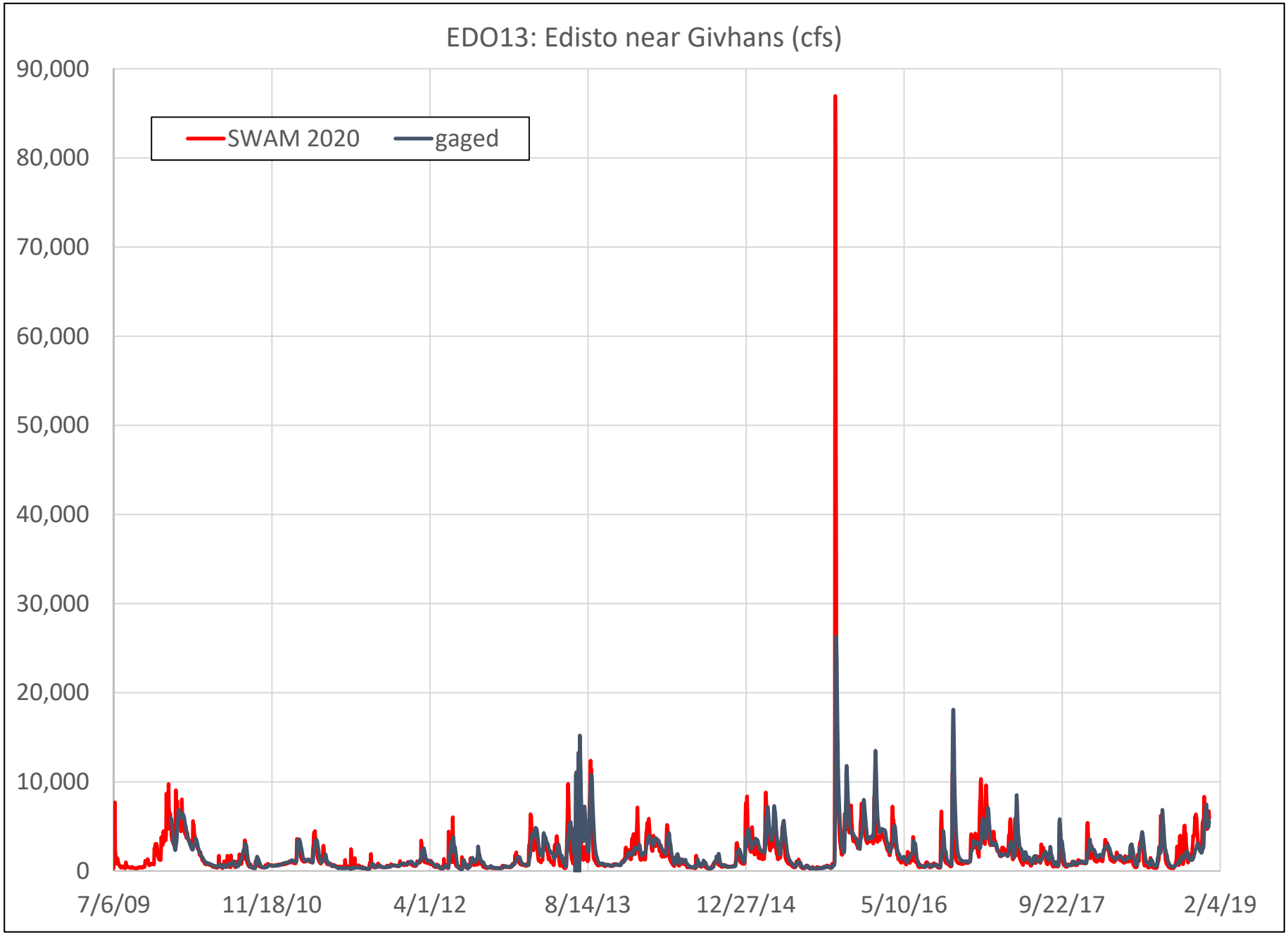
Attachment C

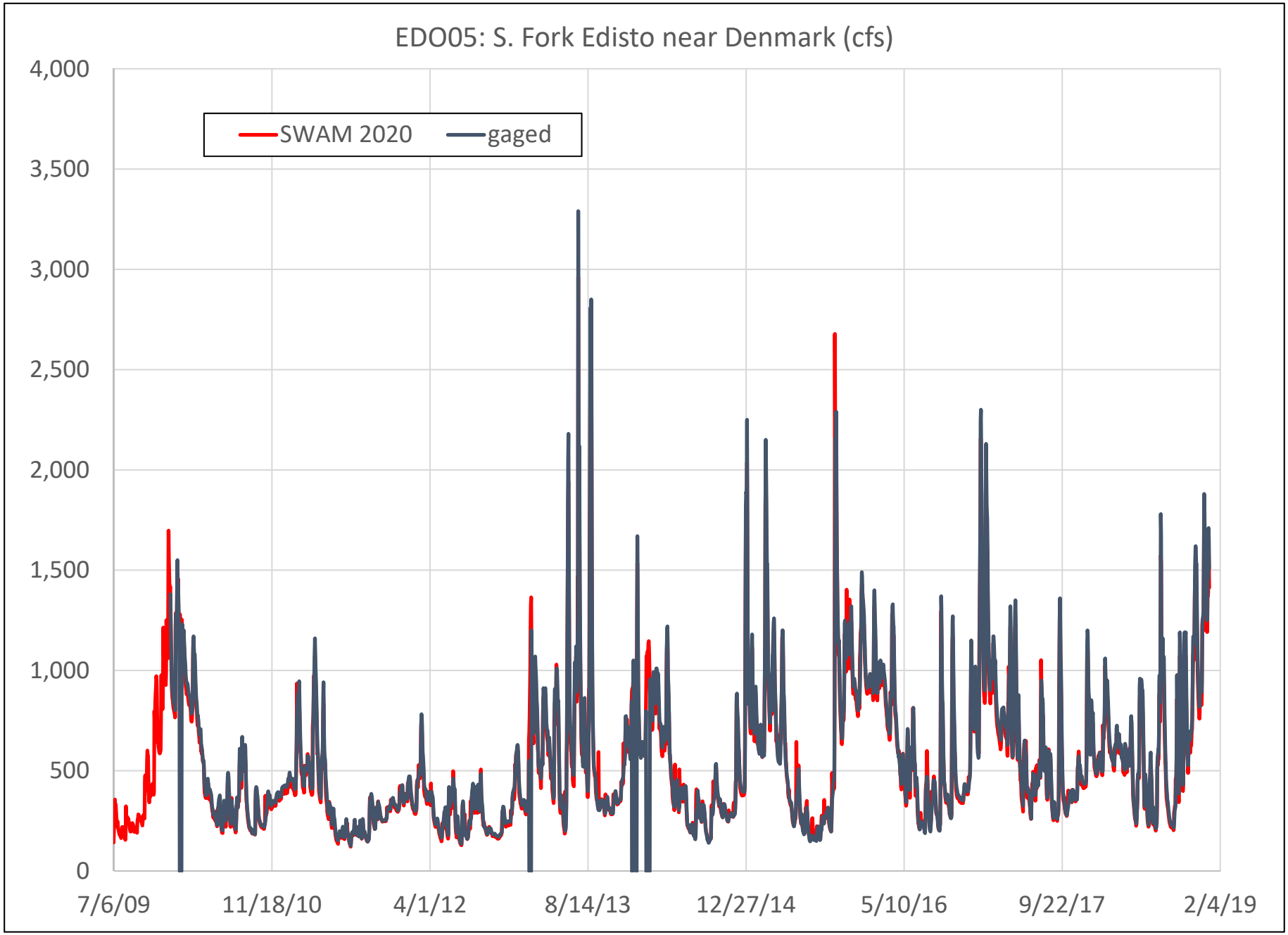
Daily Validation Results

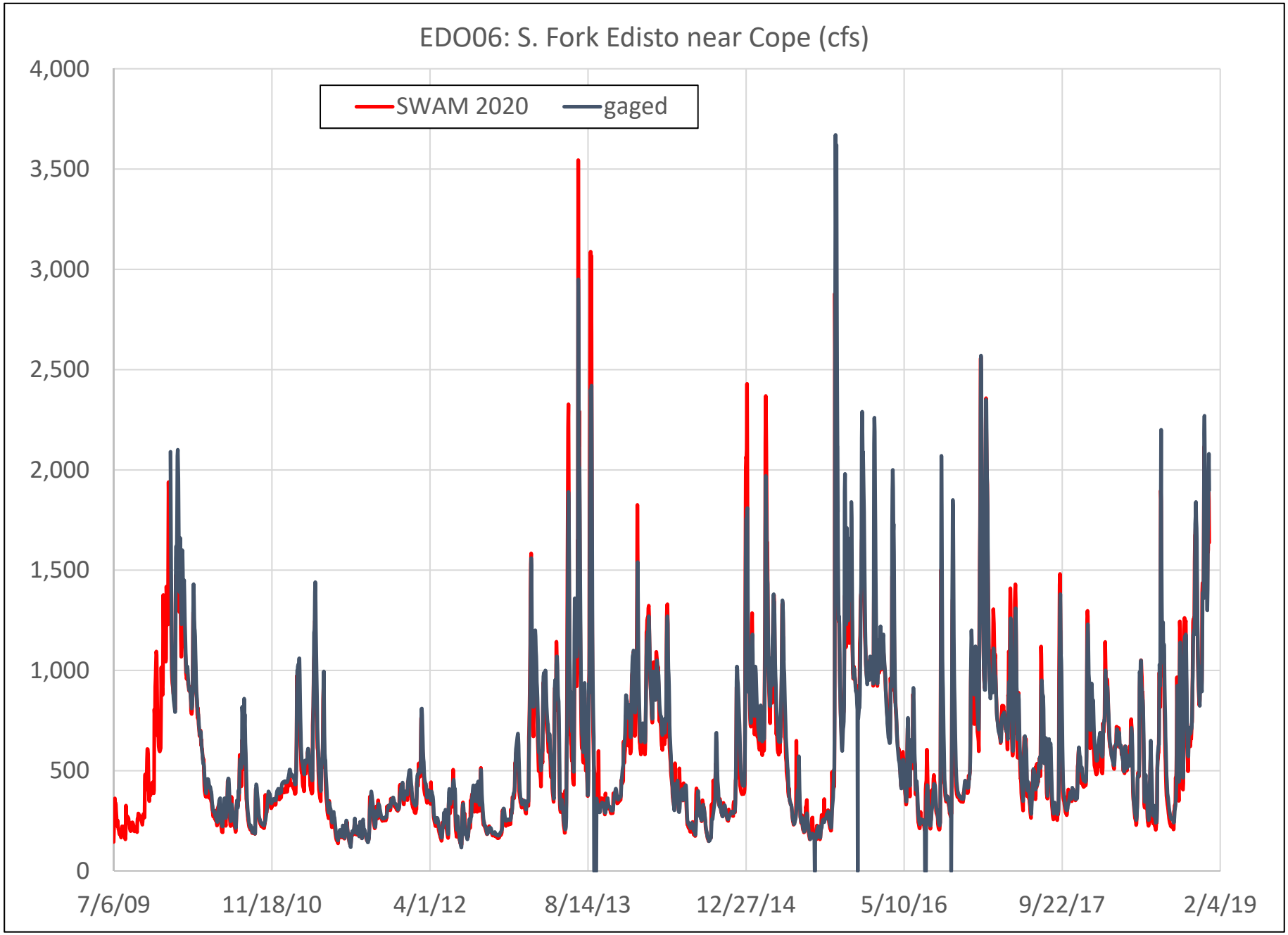

EDO10: N. Fork Edisto at Orangeburg (cfs)
10,000
1,000
100
SWAM 2020
SWAM 2018
5/18/27
1/24/41
10/3/54
6/11/68
2/18/82
10/28/95
7/6/09

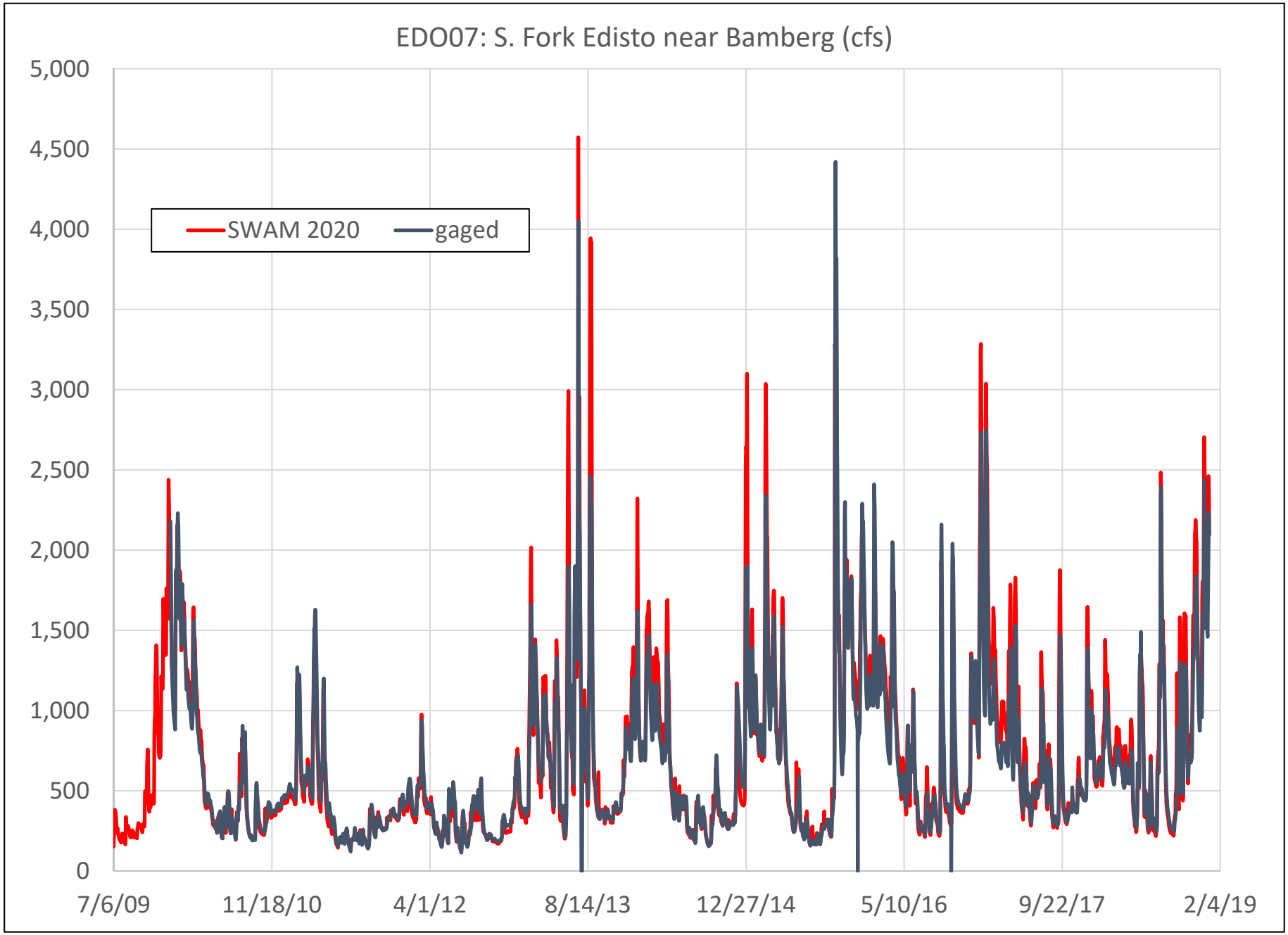

EDO10: N. Fork Edisto at Orangeburg (cfs)
SWAM 2020
gaged
3,000
2,500
2,000
1,500
1,000
500
0
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19

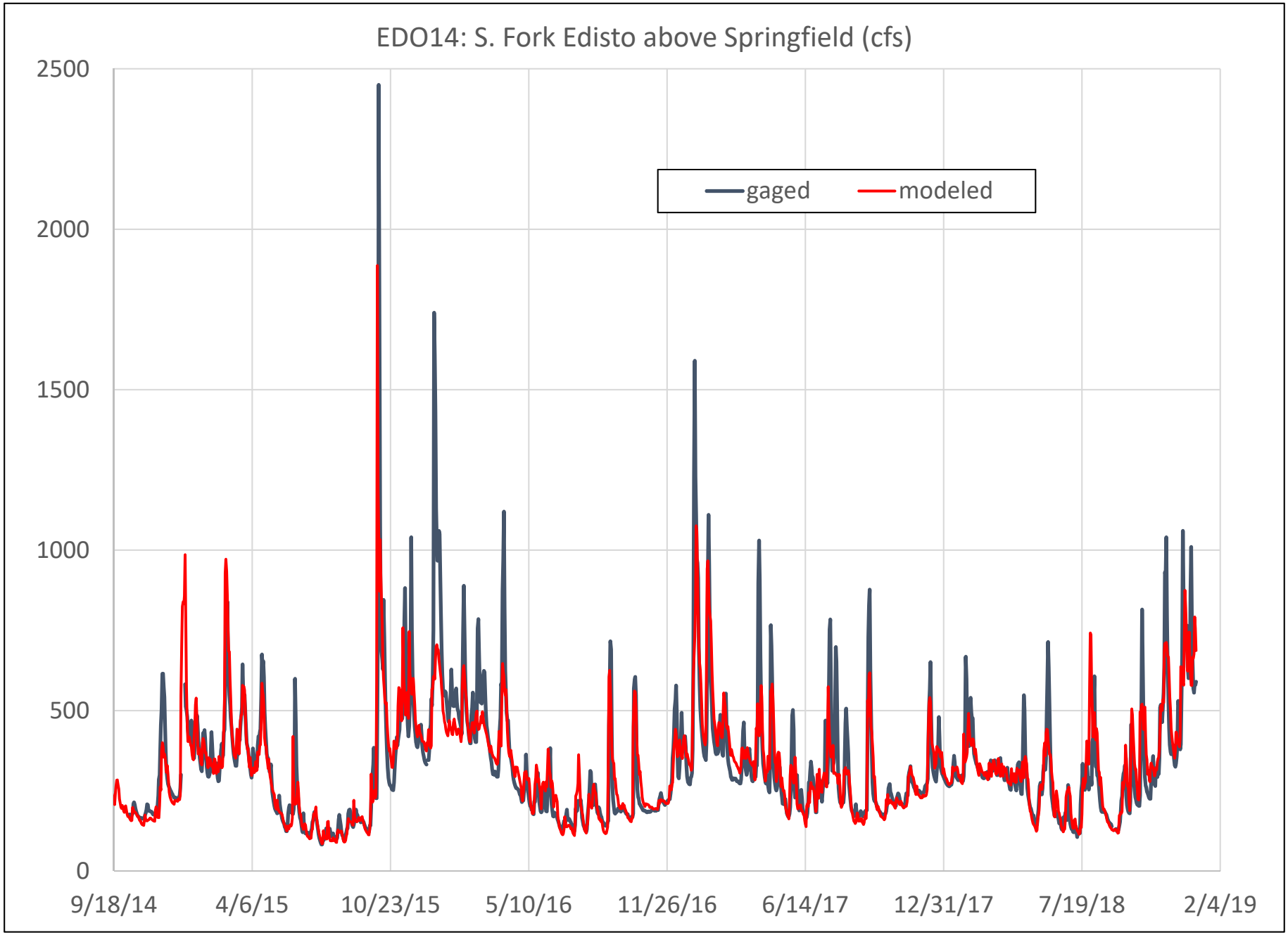

EDO13: Edisto near Givhans (cfs)
100,000
10,000
1,000
100
SWAM 2020
SWAM 2018
5/18/27
1/24/41
10/3/54
6/11/68
2/18/82
10/28/95
7/6/09

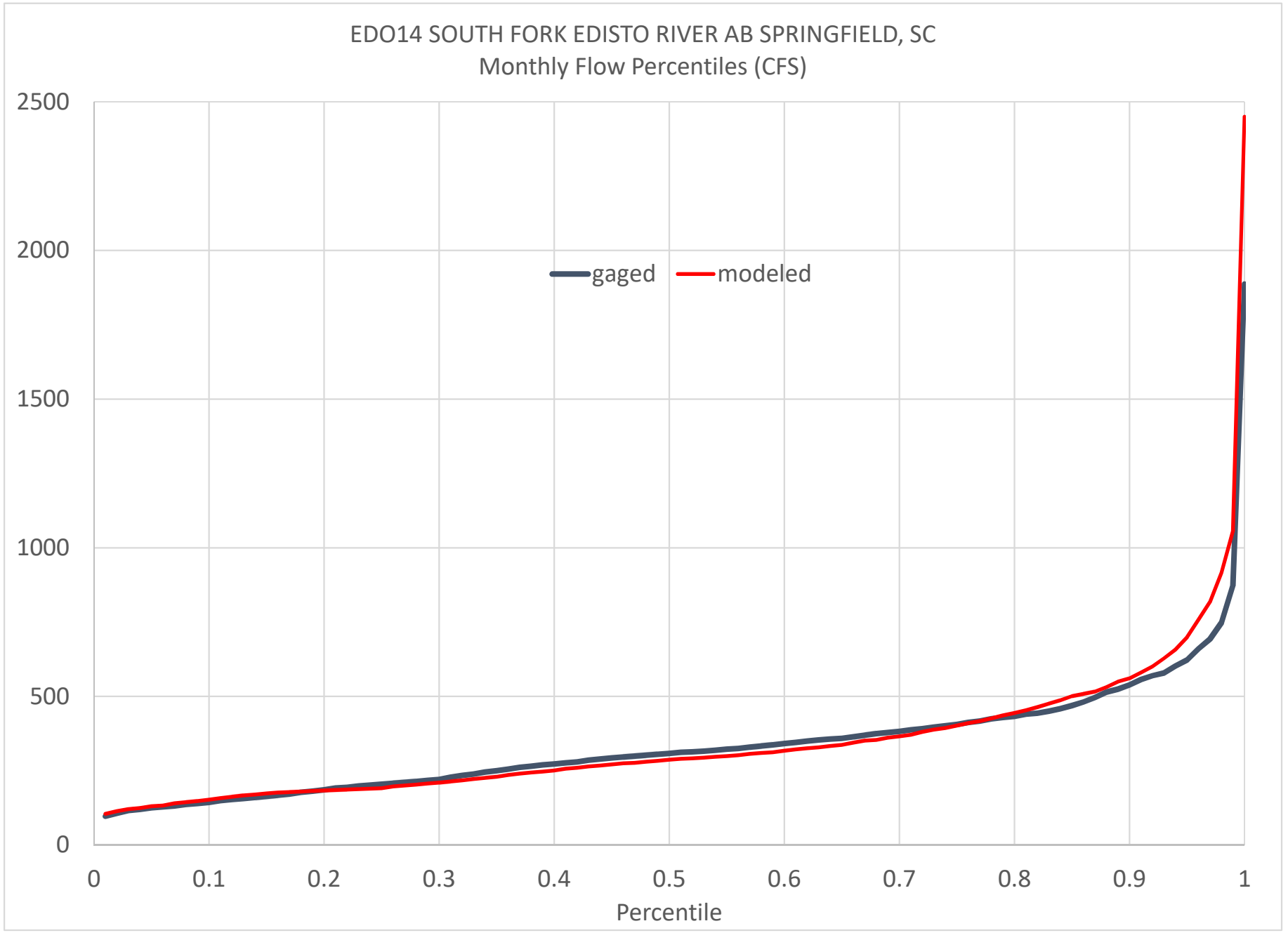

EDO13: Edisto near Givhans (cfs)
SWAM 2020
gaged
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19

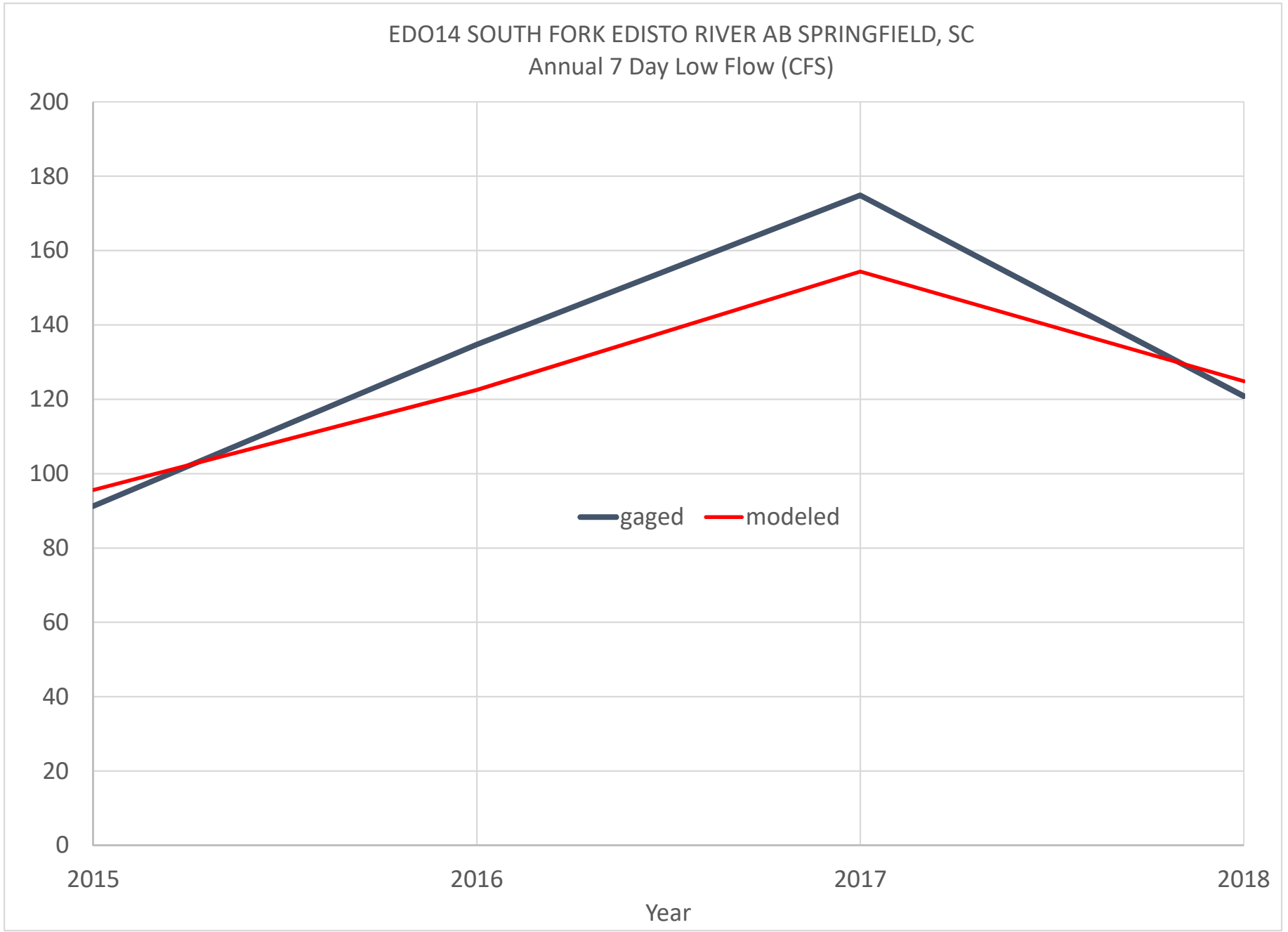

EDO05: S. Fork Edisto near Denmark (cfs)
SWAM 2020
gaged
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19


EDO06: S. Fork Edisto near Cope (cfs)
SWAM 2020
gaged
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19


EDO07: S. Fork Edisto near Bamberg (cfs)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
SWAM 2020
gaged
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
5/10/16
9/22/17
2/4/19


EDO14: S. Fork Edisto above Springfield (cfs)
2500
2000
1500
1000
500
0
gaged
modeled
9/18/14
4/6/15
10/23/15
5/10/16
11/26/16
6/14/17
12/31/17
7/19/18
2/4/19


EDO14 SOUTH FORK EDISTO RIVER AB SPRINGFIELD, SC
Monthly Flow Percentiles (CFS)
2500
2000
1500
1000
500
0
gaged
modeled
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Percentile


EDO14 SOUTH FORK EDISTO RIVER AB SPRINGFIELD, SC
Annual 7 Day Low Flow (CFS)
200
180
160
140
120
100
80
60
40
20
0
gaged
modeled
2015
2016
2017
2018
Year