



SAFE YIELD WORKGROUP MEETINGS SUMMARY REPORT



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Definitions

Agriculture Facility: any land, building, structure, pond, impoundment, appurtenance, machinery, or equipment which is used for the commercial production or processing of crops, trees, livestock, animals, poultry, honeybees, honeybee products, livestock products, poultry products, or products which are used in commercial aquaculture

Existing Surface Water Withdrawer: a surface water withdrawer withdrawing surface water as of January 1, 2011, or a proposed surface water withdrawer with its intakes under construction before January 2, 2011, or with all necessary applications for its intake permits deemed administratively complete before January 1, 2011

Mean Annual Daily Flow (MADF): the arithmetic mean of individual daily mean discharges (stream flow) for a period representative of the historic stream flow records, using flow measurements published by USGS or as determined by other Department approved, hydrologically valid data

Minimum Instream Flow: the flow that provides an adequate supply of water at the surface water withdrawal point to maintain the biological, chemical, and physical integrity of the stream taking into account the needs of the downstream users, recreation, and navigation and that flow is set at forty (40) percent of the mean annual daily flow for the months of January, February, March, and April; thirty (30) percent of the mean annual daily flow for the months of May, June, and December; and twenty (20) percent of the mean annual daily flow for the months of July through November for surface water withdrawers as described in Section 49-4-150(A)(1) of R.61-119. For surface water withdrawal points located on a surface water segment downstream of an influenced by a licensed or otherwise flow controlled impoundment, 'minimum instream flow' means the flow that provides an adequate supply of water at the surface water withdrawal point to maintain the biological, chemical, and physical integrity of the stream taking into account the needs of downstream users, recreation, and navigation and that flow is set in Section 49-4-150(A)(3) of R.61-119

New Surface Water Withdrawal: those withdrawers that apply after the January 1, 2011 deadline for any use

Permittee: a person authorized to make withdrawals of surface water pursuant to a surface water withdrawal permit issued by the Department, not including agricultural withdrawals

Registered Surface Water Withdrawer: a person who makes surface water withdrawals for agricultural uses at an agricultural facility that is filing a report pursuant to Section 49-4-50

Safe Yield: the amount of water available for withdrawal from a particular surface water source in excess of the minimum instream flow or minimum water level for that surface water source. Safe yield is determined by comparing the natural and artificial replenishment of the surface water to the existing or planned consumptive and non-consumptive uses. Calculations are prescribed in R. 61-119

Surface Water Withdrawer: a person withdrawing surface water in excess of three million (3,000,000) gallons during any one (1) month from a single intake or multiple intakes under common ownership within a one (1) mile radius from any one (1) existing or proposed intake

Introduction

The Surface Water Quantity Permitting Program was established under Title 49 Chapter 4: South Carolina Surface Water Withdrawal, Permitting Use, and Reporting Act in 2011. The implementing regulation R.61-119 establishes a system and rules for permitting and registering the withdrawal and use of surface water from within the state of South Carolina and those surface waters shared with adjacent states. The permitting, registration, use, and reporting requirements for the regulated surface water withdrawals are specified in this regulation. This regulation applies to any person withdrawing surface water in excess of three million (3,000,000) gallons during any one (1) month.

When registering or permitting a new user, the safe yield at the point of withdrawal is calculated per Surface Water Withdrawal, Permitting and Reporting Act (R.61-119). However, the Department has received multiple comments over the intervening years from stakeholders and the public concerned with the way safe yield is calculated. Therefore, the Department created a workgroup to receive feedback and input from stakeholders regarding the safe yield calculation.

The purpose of these meetings was to discuss the current safe yield formula with stakeholders from all sectors. Additionally, the Department solicited suggestions for how the formula may be improved. Four meetings were held, in person and virtually, to discuss potential changes to how safe yield is calculated and to discuss feedback from the stakeholders.

Background

Regulation R.61-119 charges the Department with permitting surface water withdrawals over 3 million gallons per month (mgm). Surface water withdrawers were divided by statute and regulation into three categories: existing, new, and registrations.

User Types

“Existing surface water withdrawer” is a surface water withdrawer withdrawing surface water as of January 1, 2011, or a proposed surface water withdrawer with its intakes under construction before January 1, 2011, or with all necessary applications for its intake permits deemed administratively complete before January 1, 2011. These users were able to apply for a permitted quantity of water based on the greatest of the following: documented historical water use, current permitted treatment capacity, design capacity of the intake structure as of January 1, 2011,

design capacity of a pending intake structure permit application deemed administratively complete as of January 1, 2011, an amount necessary to recover, through the sale of water, indebtedness from an outstanding bond or revenue certificate issued prior to January 1, 2011, and for a publicly owned water utility, the safe yield of the utility's existing or permitted water supply only reservoir. Existing permits have durations from 30 to 50 years.

"New" surface water withdrawals are those withdrawers that apply after the January 1, 2011 deadline for any use that is not agricultural. These new withdrawals are subject to reasonable use criteria, which includes safe yield calculations and the 20%, 30%, and 40% minimum instream flows at the point of withdrawal. These have permit durations from 20 to 50 years.

"Registrations" or registered surface water withdrawals are agricultural users, who are subject to safe yield calculations at the point of withdrawal, but not subject to 20%, 30%, 40% minimum instream flows. Registrations do not expire. Each type of withdrawer is required to submit water use annually to DHEC.

Safe Yield Calculation

The safe yield is calculated at the point of withdrawal for a user. This means that the safe yield changes as a withdrawal point is moved up and down a stretch of river or stream. The calculation for safe yield is laid out in R.61-119.E.3.a.ii and varies based on the location of the surface water intakes as follows:

(A) For withdrawals in a stream segment not influenced by a licensed or otherwise flow controlled impoundment, the safe yield is calculated as the difference between the mean annual daily flow and twenty (20) percent of mean annual daily flow (MADF) at the withdrawal point, taking into consideration natural and artificial replenishment of the surface water and affected downstream withdrawals.

(B) For withdrawals located on a stream segment materially influenced by a licensed or otherwise flow-controlled impoundment, the safe yield is calculated as the difference between mean annual daily flow and the lowest designated flow in the license specified for normal conditions (non- drought), taking into consideration natural and artificial replenishment of the surface water and affected downstream withdrawals and natural attenuation of the stream flow between the licensed or otherwise flow controlled impoundment and the surface water withdrawal point.

(C) For withdrawals from a licensed or otherwise flow-controlled impoundment, safe yield is calculated as the maximum amount that would not cause

a reservoir water level to drop below its minimum water level or to be able to release the lowest minimum flow specified in the license for that impoundment as issued by the appropriate governmental agency.

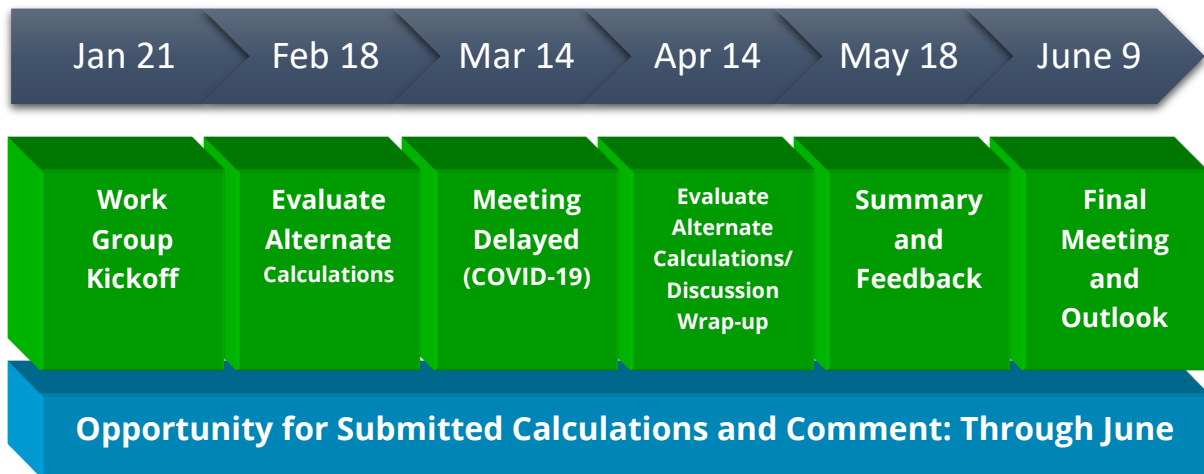
(D) For withdrawals from an impoundment that is not considered a licensed or otherwise flow controlled impoundment under this regulation, the safe yield is calculated as the maximum amount that would not cause the impoundment water level to drop below its minimum water level as established by the Department with input from the applicant and the owner(s) and operator(s) of the impoundment consistent with E.3.i(C)(2) above.

(E) Safe yield shall be considered as one factor in issuing a withdrawal permit as outlined in Section 49-4-80(B). Should withdrawals in excess of the safe yield be permitted, additional contingency planning shall be required of the permittee.

The regulatory definition specifies to take into consideration downstream withdrawals. The Department uses calculated unimpaired flows (UIFs) at downstream users and subtract all permitted and registered upstream users and add known discharges. This is calculated on a monthly interval over the period of record for the gage. The 25th percentile flow is determined per the USGS definition of normal flow (between the 25th and 75th percentiles). This number is used to verify that the new user would not keep downstream users from withdrawing their total permitted or registered amount. This is essential because the original MADF minus 20% of the MADF calculation can give a false sense of available water downstream.

Workgroup Purpose and Process

Below is the timeline and goal summary for the safe yield work group.



Workgroup Goal: To evaluate how safe yield is currently calculated and to examine possible alternative calculations that the Department should consider.

Workgroup Participants: The Safe Yield Workgroup is made up of over 20 different stakeholders and SCDHEC staff representing a broad array of those with vested interest in our state's surface water withdrawals management including farmers, academics, water suppliers, conservationists, industry professionals, and partners at other state agencies.

Staff at SCDHEC made summarized minutes and provided presentation slide decks (found in Appendices A and D) after each workgroup meeting publicly available on the Department's website. Members of the workgroup were encouraged to submit any proposal for an alternative calculation to safe yield throughout the workgroup process. SCDHEC staff continued to provide information and adapt the workgroup meetings as the COVID-19 pandemic began to occur in our state. The purpose of the workgroup, again, was to focus on the current way safe yield is calculated in South Carolina and to evaluate alternative calculations, Safe Yield calculations were evaluated under the following criteria:

- Is it allowable under current law?
- Is it scalable to Statewide Permitting Process?
- Is calculation protective of the resource (while still allowing for use of the resource) across varied stream types?
- Can the evaluation be done given the Departmental resources?
- Does it materially improve the technical evaluation process?

Methods Evaluated

The work group primarily focused on the Safe Yield formula for withdrawals along a stream segment not influenced by an impoundment. The safe yield is currently calculated per R.61-119 as *“...the difference between the mean annual daily flow and twenty (20) percent of mean annual daily flow at the withdrawal point, taking into consideration natural and artificial replenishment of the surface water and affected downstream withdrawals.”* The Department asked stakeholders to give comments on the current calculation and suggestions for alternative calculations for safe yield that fit within the framework of the Surface Water Withdrawal, Permitting, Use and Reporting Act 49-4-10.

One suggested alternative was received. It, along with alternatives developed internally by the Department, were presented to the stakeholder group for comment. The potential alternatives that were presented are as follows:

- Monthly 25th Percentile flows (75 Percent Exceedance (PE) flows) – Minimum Instream Flows (MIF) (40% for Jan-Apr, 30% for May, Jun, and Dec, and 20% for Jul-Nov as defined by the Act)
- Monthly 10th Percentile flows (90 PE flows) – MIF
- Monthly 20th Percentile flows (80 PE flows) – MIF
- Monthly 40th Percentile flows (60 PE flows) – MIF
- Monthly Median – MIF
- Monthly Mean – MIF

The figures¹ in Appendix B present a graphical representation of the methods presented to the stakeholder group. Six gage stations were analyzed across several basins. For each method, the percentage of time that the available safe yield goes to 0 for that gage is listed on the graph for reference.

Method Summary and Findings

The main similarity across the methods evaluated was doing each calculation on a monthly time-step as opposed to using annual flows across all months. This allows for permits to have variable limits based on the month due to the monthly MIF requirements ranging from 20% to 40%. This is a significant change to how safe

¹ Some of the data originally presented on each graph have been removed to make it easier to digest the data. A “zoomed in” version of each graph is included, where the x and y axes were truncated in order to better show the minima and maxima within the data.

yield is currently calculated and can allow for users to pull more in other months in order to have a source of on-site storage to use when streams are at lower flow conditions.

Steven's Creek (near Modoc, SC 02196000) is a flashy stream with highly variable flows and had the highest percentage of times going to 0, but still had flow ~33% of the time when using Median-MIF and 40th percentile flows. The most resilient gage, South Fork Edisto River near Denmark, SC (02173000), never went to zero even when using 10th Percentile flows. Even so, the monthly 10th Percentile flows yields few times in which there is safe yield available across the different gages.

Feedback Summary

Before the final June 9th meeting, the workgroup was sent a brief process summary and summary of the alternatives that were earlier presented to the group. The workgroup was asked to review these documents and then complete a feedback questionnaire (located in Appendix C). During the final meeting the feedback received and the next steps in the Department's evaluation were discussed. Recent registrations and the impact on available safe yield were also reviewed.

Stakeholders provided feedback that was generally positive. The most consistent comment was that the group was appreciative of the Department taking the time and effort to put this group together and allow for comments and critiques from stakeholders. The group was generally open to changes in how safe yield is calculated, but felt that the more consequential issues were with the law and regulation and not the calculation alone. Some believe that all user types need to be subject to all stipulations of use, such as MIF.

There were several critiques with the process. One was the Department completed this process before the South Carolina Department of Natural Resources (SCDNR) led River Basin Councils (RBCs) were able to start their meetings. The Department recognizes the importance of the RBCs and the statewide water planning process; however, given the uncertainty of when the basin plans and statewide water plan would be completed, the Department decided to move forward with the workgroup.

Another issue some stakeholders had was that this process had a very specific goal in mind, and many meetings delved into details outside the scope of the workgroup (issues with MIF requirements, reasonableness criteria, etc.). These discussions, though outside the original scope of the group, did provide highlight to concerns with the law and regulation that impact the ability of the Department to effectively manage the States surface water resources.

Conclusion

Upon conclusion of the Safe Yield Workgroup meetings, the Department evaluated the feedback received concerning the alternative safe yield analyses presented. While it appears that marginal improvements to the safe yield formula could be pursued by the Department through an update to the regulations, it is the opinion of the Department that such marginal improvements would not translate to a significant improvement in the evaluation and decision-making process. Consequently, the Department has determined not to pursue a change in the safe yield formula at this time.

Appendix A

Safe Yield Meeting #1 Summary

January 21, 2020

Alex Butler (South Carolina Department of Health and Environmental Control):

Welcomed the Group and Presented the Agenda. Introduced Dr. Marcus

Mike Marcus: Welcomed Everyone. Detailed the Group was intended to evaluate the current safe yield calculation and examine possible alternatives without predetermining if one calculation was better than another or if a change was needed.

Alex Butler (Slides): Went over the Goal and timeline of the group. The Goal is to evaluate the safe yield calculation in R61-119 and examine possible alternative calculations. Other concerns that would need a change to the Statute are not up to discussion. Those issues and ideas should be routed through the Water Planning Process led by South Carolina Department of Natural Resources (SCDNR). If the department determines the Safe Yield Calculation needs changing, a regulatory change would be needed.

The Timeline for the work group is:

January 21: Workgroup Kick Off

February 18: Evaluation of Alternative Calculations

March 17: Evaluation of Alternative Calculations

April 14: Discussion-Wrap Up

May 15: Summary Report

Introductions of those in attendance:

Jeff Allen: Director of SC Water Resource Center at Clemson; PPAC

Jocelyn Walters Brannon: BOW Public Participation Coordinator

Pradeep Adhikari: Surface Water Permitting Program, Hydrogeologist

Leigh Anne Monroe: Surface Water Permitting Program, Hydrogeologist

Alex Pellette: SCDNR, Hydrogeologist

Rob Delvin: Director DMAP, DHEC

Ryan: Columbia Water

John Baker: International Paper.

JJ Jowers: Bamberg County; PPAC.

Ed Bruce: Duke Energy

Mike Caston: Former Consultant, Citizen

Jill Miller: SCRWA; PPAC

Gerrit Jobsis: American Rivers Regional Director

Charles Wingard: Lexington County; Farm Bureau; Chair of Water Committee

Scott Harder: Lead Hydro at DNR; PPAC.

Hugo Krispyn: Friends of the Edisto; Edisto River Keeper

Doug Busbee: Aiken County; Citizen

Eric Krueger: Nature Conservancy

Tommy Lavender: Attorney with law firm; Chamber of Commerce

Kristy Ellenberg: DHEC; Director of Collaborative Partnerships and Strategic Initiatives

Joe Gellici: SCDNR; Retired Lead Hydro

Jessie Cannon: Santee Cooper; On

Lance Foxworth: Groundwater Permitting, Hydrogeologist

Courtney Kemmer: Groundwater Permitting, Hydrogeologist

Myra Reece: DHEC, EA Director

Leigh Anne (Slides): Gave a brief summary of other Southeastern States methods for handling water withdrawal permitting. States researched: Alabama, Georgia, Kentucky, Maryland, Mississippi, North Carolina, Tennessee, Virginia

Alex Butler (Slides): Presented on the Current Law and Regulation governing Surface water Permitting in South Carolina. Major points were on the Definition in the Law of Safe Yield and Minimum instream Flow. How Safe Yield is calculated in R.61-113 was presented. Five Gauges were selected by the Department for review of impacts of safe yield calculation. There was discussion on who was subject to Safe Yield Review (New Permitted and Registered Users only). There was also discussion on how Mean Annual Daily Flow (MADF) is calculated (Use the entire period of Record).

Alex Butler (Slides): Presented 3 examples of Alternative Safe Yield Calculations at the five example gauges. The Methods presented and discussed were:

1. Minimum Monthly Flow - Minimum Instream Flow
2. Mean Monthly Flow - Minimum Instream Flow
3. Median Monthly Flow - Minimum Instream Flow

Metrics for evaluation of Alternative Safe Yield Calculations are:

- Is it allowable under current law?
- Is it scalable to Statewide Permitting Process?
- Is calculation protective of the resource (while still allowing for use of the resource) across varied stream types?
- Can the evaluation be done given the Departmental resources?

Action Items from Meeting #1

1. Workgroup Members should submit Suggested Alternative Calculations to be reviewed during the Feb18th Meeting by February 8th
2. The Department will develop a list of 5 or so assumptions the group is operating under. For Example, "No method will completely eliminate the risk that a registered user could use 100% of the flow under all circumstances"
3. The Department will add Steven Creek Gage to the example gauge list at the request of DNR

**Meeting Number 2 is Scheduled for February 18th at 2600 Bull St. in Columbia.
The Meeting has changed to 9am-12pm**

Safe Yield Meeting #2 Summary February 18, 2020

Alex Butler (SCDHEC): Welcomed group. Agenda setting items. Follow up from last meeting: only DNR submitted alternative method for discussion for Meeting 2. DNR will present their method.

Timeline Ahead:

March 17: Evaluation of Alternative Calculations

April 14: Discussion-Wrap Up

May 15: Summary Report

Attendance:

Alex Butler: SC DHEC

Leigh Anne Monroe: SC DHEC

Jocelyn Brannon: SC DHEC

Kristy Ellenberg: SC DHEC

Alex Pellett: SC DNR

Frank Eskridge: Columbia Water

Hugo Krispyn: FRED, ERK

Greg Carbone: USC

John Baker: International Paper

Jesse Cannon: Santee Cooper

Tommy Lavender: Attorney, Chamber of Commerce

Charles Wingard: Farm Bureau

Jill Miller: SCRWA

Scott Harder: SC DNR

Jeff deBessonet: WEC

David Wilson: Farm Bureau

Mike Caston: Citizen, Retired SJWD

Doug Busbee: Citizen, Aiken County

Rebecca Haynes: CVSC

Jeff Allen: Clemson

Eric Krueger: TNC

Courtney Kemmer: SC DHEC

Rob Devlin: SC DHEC

Lance Foxworth: SC DHEC

Reminder of Goal: To evaluate safe yield and what the Department should consider as possible alternatives. Any decision will have to come by a regulation change; not a law change.

Alex Butler (Slides): A refresher on focus of workgroup. Here to discuss safe yield and what SC DHEC would have authority to change in regulations. Not: IBT, exemptions, permit duration, grandfathered permits, etc. SC DNR, the Water Planning Process, and the Legislature are the entities to deal with law changes and other concerns regarding Surface Water Withdrawal Act. Focus is on how water is managed the majority of the time; not based on extreme circumstances (ie. Drought Act)

Workgroup Assumptions:

- Changes to the SY calculation may cause stream segments to become over allocated
- No SY calculation can guarantee MIF will be present 100% of the time
- Changes to the SY formula will not impact existing permitted users or registrations

Assumption Proposal and Discussion: *A statewide formula may not be tenable. Stream classification is varied across SC and one formula may not be the best way to evaluate every stream. Does law/reg allow for this? Is this an assumption or a scientific argument standard?*

Alex Butler (Slides): How alternatives will be evaluated.

- Is it allowable under current law?
- Is it scalable to statewide permitting process?
- Is calculation protective of the resource, while still allowing for use of the resource, across varied stream types?
- Can the evaluation be done given the Departmental Resources? (staff of 2)

Rob Devlin: Remember, Dr. Marcus (BOW Chief) stressed, "If we do something different, then it has to be better. Not just different."

Discussion on Safe Yield Formula: *Statewide or basin type formulas? Over vs under protective? Difference in nature of flow dynamics could affect outcome of formula. The right formula should take into account these differences, however. Some states have different management systems based on parts of the state. DHEC already operates one-size fits all permitting programs in the state. I'll push back on that. Just because we have*

one size fits all in other programs in DHEC doesn't mean we can't evolve beyond that. Site specific studies?

Alex Butler: if the onerous is on Department, that might not be able to be done effectively. Remember scalability, and that we have two staff dedicated to program. Refocus. Introduces Rob Devlin for presentation.

Rob Devlin (Slides): Presentation on the three categories of permits/registrations (New Permits, Grandfathered Permits, and Registrations). Rob briefs on other water quantity programs in division and historical information. Surface Water Regulation history and a breakdown of number of each of the three surface water withdrawal category types. The following information is discussed for the three categories: permit duration, permitting amount basis, public notice, MIF requirements, reasonableness criteria, safe yield applicability, operation/contingency plans.

Discussion on Rob's Presentation: *Conversation on how gauges are used in permitting and SWAM Model. Also how would a monthly breakdown on a permit be checked/enforced? Percent of withdrawers we have control over is 4%. How much can we really do without a law change? Is the squeeze here worth the juice? We are trying to prepare for the future. Not trying to fix any permitted problems currently. **We cannot deal with law changes in this group.** One outcome of this meeting is that there is no real good way to do this in this setting. My hope, has always been, with all these stakeholders, that part of the process, is that we say these are the recommendations we have. Clarity surrounding this law in just this inner stakeholder group has improved drastically. Imagine how unclear it is for those outside of this group.*

Alex Pellett (SC DNR; Presentation and Comments): The law does specify a safe yield calculation. It says safe yield is excess of MIF, so Safe Yield = current streamflow - MIF. This means safe yield is not a static number. It is a dynamic number. The regulatory safe yield does not reflect the definition in the law. The law says leave 20%, the reg. says you can take 80%. Remember, streamflow is usually not a 100% average during the summer. BUT, safe yield itself is defined in relation to MIF. The last line in the legal definition of MIF refers to specific part of act that has big implications: MIF is only thus defined for new permits, not registrations or grandfather permits. MIF, if you go back to safe yield definition, then it means MIF for registrations is undefined. The way the regs are applied right now, I don't see anything preventing a new upstream registration from causing a shortage for a downstream registration.

Discussion on DNR Comments: *Safe yield seems to be a misnomer. Group agreement. With new upstream permits, has potential to affect grandfather permits/registrants downstream? Even with water that might not be available? That's the difference, the law cares little about flow, it is just about legally available water. That is hard to describe safe for yield. DNR decided going back that the 20, 30, 40, the best information at the time, that it would be protective. Now you're saying that it's all BS cause of this line in the reg. It is disappointing.*

<Break>

Alex Butler (Slides): Alex presents graphs for alternative calculations on state gauges. The slides will be provided. Alex presents Edisto basin scenarios as examples. Alex presents on percentile method.

Discussion: *Allocated vs. used water and the effects that has on permitting decision and assumptions made about withdrawal. DHEC is obligated to protect existing users and amount allocated to them. Edisto July example discussed in depth. Implications of scenario on upstream users from Charleston intake. Changes in industry and practices have shifted from when laws like this were written, such as industry installing its own water plants vs. locating where water delivery infrastructure already exists. This is a finite resource. We know the days are coming when we have to say no. Whether for a day, or a period of time, to eventually just saying no year round. Concerns and conversation about withdrawers and water security, especially water they are already allocated; not giving it up. Department can bring withdrawers to conversation about reducing permit amounts but no authority to actually do so; cooperative, not coercive. Conversation about how state is not actively managing the water.*

Alex Butler: Remember, we are not here to change any laws. We have to stay focused on purpose of this group. Returns to graphs and discussions on them.

Discussion: *Give safe yield a science basis. Ecological basis. Science is the opposite of the law here. Reconcile science and law is important, but that's a long way to go. Looking for an incremental improvement. Eric's group is looking bio-flow standards and a wholistic standard. The 20 30 40 and 20 30 60, that rubric was developed on ecology and flow science of the 80s. Things have come along way and there is a lot of advance in those relationships. We can't do anything worthwhile with the tools available to us here. We may find we can't do anything. this is a good interdisciplinary group. Should we put it on paper and be willing to sign in on it and on paper about our thoughts here. We can have a good statement with some effect to help DHEC instead of leaving them out in the wind. To what*

extent are these formulas we are discussing arbitrary calculations and to what extent are they based on science? To what extent are we deciding here based on who might be affected instead of what is protective of the resource?

Action Items:

- Workgroup should submit any new alternative calculations by March 3rd.
- Those interested in law changes: get involved in DNR Water Planning Process (PPAC)

12:02PM Adjourn

Safe Yield Meeting #3 Summary

4/14/2020

Platform: Microsoft Teams

Meeting Start: 9:00 AM

Begin with Alex Butler (SCDHEC) Prepared Presentation and Meeting Format Rules:

Use chat feature to ask questions so we do not get a lot of feedback.

Some people are having trouble getting into meeting, there is no call-in number available on this platform.

Thank you everybody for bearing with us – we wanted to keep the process moving along, we are operating business as usual within Bureau as much as possible. We will have another in person meeting before this is over, but we wanted to keep things moving.

I'll share my screen with the presentation. I have everyone muted, if you would like to speak either unmute yourself or you can use the chat option.

Tips to keep us going:

keep mics on mute unless speaking, use chat feature if possible to try to keep things functional.

This is the 3rd meeting of safe yield workgroup:

We have some new registrations in the Edisto

We will go over additional suggestions submitted by the workgroup

I don't think this will go to noon, but we can if we need to.

Where we're at in timeline:

Rescheduled and canceled the meeting originally scheduled for March 17TH, summary report likely pushed back due to current COVID situation.

As a reminder, the goals of these meetings are to evaluate how safe yield is currently calculated and to examine possible alternative calculations that the Department should consider. Keep in mind, any changes to the regulation will need to go through regulation change which is a separate, long process. We are trying to focus on safe yield calculation as outlined in R. 61-119 outlines permit duration, hierarchy of use, grandfathered permits, exemptions, inter-basin transfers, public participation requirements, and minimum instream flow values. We are not talking about a law change, we are talking about what we can do to improve safe yield calculation within the current framework of the law.

Alternatives will be evaluated base on if:

It is allowable under current law.

It is scalable to the Statewide Permitting Process.

The calculation is protective of the resource while still allowing for use of the resource.

If the evaluation can be done given the Departmental resources.

To give everyone an update we have had new registrations in the Edisto since the last meeting including Rast Farm, Sedso Farms, and Lois Ann Farm. We've seen a version of this map before showing the Edisto basin, Leigh Anne shared a version of this showing allocation. We foresee more large-scale registrations like this in the future and you can see this stream is fully allocated.

Since last time we also looked at how allocations along rivers are made. The blue line is gaged flow, orange line is minimum instream flow, yellow line is current safe yield, and the dark line is the flow minus the safe yield. Using the current calculation, the safe yield is exceeding flow 62% of time in the South Fork Edisto River, 46% of the time in McTier Creek, 50% of the time in the Reedy, 58% of the time on the Pee Dee, and 35% of the time on the Tyger. DNR asked us to look at Steven's Creek – 75% of time SY is not in river according to current calculation.

Comments, questions, concerns up to this point?

Just an observation. The last new registration is roughly 1 mil gal/day.

We cannot determine reasonableness for ag facilities, if it is below the safe yield value then the facility is registered when they submit the paperwork to the Department.

Is that amount currently in use?

The intake is not yet constructed, so it is not used in that amount yet.

I need to leave in a bit, wanted to introduce Cassie Ratliff. She recently got promoted and will be working closely with water.

Welcome.

Going back to my screen, after the last meeting we did get a Safe Yield Alternative suggestion examining percent exceedance. We used this looking at the same 5 creeks. Up in the right-hand corner shows how often the flow goes to 0. The line drops closer and closer to 0 moving from median percent exceedance to 90% exceedance. This is how the graphs look for each of the stations. Under the alternative, for the 90% exceedance there would be no safe yield 33% of the time in McTier, 17% of time in the Reedy, 50% of the time in the Pee Dee, 50% of the time in the Tyger, and 100% of the time in Steven's Creek. It's hard to see the graphs clearly, we will send out the PowerPoint immediately following the meeting. I believe there is a calculation error on the first graph for the Tyger, we will correct that before we send it out.

Discussion/questions on exceedance:

Since we only have very few places in the state reaching 100% under the current calculation compared to exceedance. How will this affect current permits?

We will run the allocation exercise. Under current permits and registrations in the basin overallocation was in June. We will look at statewide.

Any other questions or comments before moving on?

What's next? We've evaluated different alternatives that have been sent to us, does anyone else have any suggestions or comments that need to be examined prior to 4th meeting. The goal of 4th meeting is to

wrap up and create maps demonstrating current state. Do we need to have more than one more meeting? Any other thoughts for what should be covered in the next meeting? Would participants like to submit written comments?

The connection got lost, will this presentation be available?

The presentation will be sent to the group and Lance will post it on the web. We will send the presentation out to group immediately following the meeting.

It is hard to grasp on graphs, were some of the options looked at actual improvements on stream segments relative to the current calculation? Were any potential improvements?

That depends on how you look at it and what you call improvement. The amount of water available for permitting and registering would decrease, but flow in rivers would increase. That could be seen as an improvement for the ecosystem but not an improvement for the withdrawers. The thing to keep in mind is will we be allowed to use the resource while being realistic about what is available.

Is the issue worse in the Edisto or is it equal in every basin? I guess it would be in the nature of proposed withdrawals.

Different parts of the basin are affected differently, there are variations even within the basin under how the current calculation works. Safe yield numbers and flow are incredibly high downstream as currently calculated but are lower in headwaters. Is there a single solution? Maybe not, it may be the case that we need to try to develop different ways to look at this.

There could be a single solution applied to all basins.

How many alternatives have been evaluated? It's hard for ag to spend time on this right now so we should look at finalizing the process after the current crisis has been resolved.

We are not looking to rush through this, everyone is dealing with different situations due to the current crisis. We are still in the data collection and evaluation phase if you have other suggestions to be discussed prior to last meetings. We want everyone's opinions because we have many different viewpoints involved in this workgroup.

A suggestion for the next meeting is to take one watershed that you think is relatively typical and compare overallocation for each of the different scenarios that have been proposed. I find curb fitting appealing, but it doesn't have to be right on the curb. Second question, are you providing monthly max for withdrawers?

To this point scenarios have been evaluated on monthly time steps using minimum instream flow as defined in regulation.

Back to the slides, for the 4th meeting we will try to schedule out to have a more in person meeting as we would like to not have the last meeting of this process be remote, will play by ear. If we need to meet remotely, we will try to have call-in line and use same Teams platform. If participants want to send written comments about the process so far and any alternatives for safe yield calculation, if you feel you want to add something for stakeholder involvement, please submit in written format as we try to start reporting this out.

I would like to have the option to submit written comments.

We will send a follow-up email and include the timeline for comments. We'll make sure it is appropriate given the current situation.

We'll take comments from the meeting and any written comments while remembering that Department cannot change the regulation, it would need to go through regulatory change process.

Any closing comments, thoughts...

I'm curious about your take on safe yield calculation. It comes to a point where permits are for water that isn't always there. How do you see that playing out for areas that are 100% allocated? These are relatively new areas but how does it play out when you have 5 farms that need to draw water at the same time that isn't there?

The permitting process isn't a guarantee of water. That may be something the withdrawers need to figure out among themselves. We may issue registrations and permits in excess of what is actually there, the person downstream may have just drawn the short straw. Issuing new permits and registrations is a little different.

I'm a little familiar with some of these creeks. There is a lot of water, but it is on flood plains or braided systems. Permits must be set up on some reservoir or pond.

New big registrations are not yet constructed, I don't even know if they could build an intake for the amount they want to withdraw.

Is existence of the safe yield workgroup causing a run on registrations?

I don't know, what we are seeing now, I personally had anticipated this would happen at some point, but I am not sure if we are cause or if timing just happened to line up

I thought at the beginning of the first meeting you said we have to work under existing framework. Are we now examining regulatory changes?

We are not pursuing change to law, that is outside of the agency's scope. We are to implement the law through the regulation. We are looking to see if there is a way to change the regulation under the law. Not a lot of room to interpret law in a lot of areas, but the exception is safe yield because the actual calculation is not defined within the law.

So we can pursue changes to regulation?

Correct, we may come out of this process that the department decides to pursue changes in the regulation, but that is not an overnight thing either.

The Edisto basin is about to kick off basin planning – suggestions for next meeting would be to see if additional ideas can be studied in basin specific recommendations. I assume Edisto planning will be able to explore other ideas in more detail that would come out of recommendation and would carry a lot of weight with it.

We are in the middle of water planning and the department recognizes that recommendations would come out of it. We do not know the timeline on water planning yet, changes that people feel are needed to the law I encourage you to talk to Scott and DNR. We are aware that things are likely to come out of planning groups that would cause us to update regulations if needed.

DNR's position for the last 3+ years for water planning has been to look at safe yield, the planning process should be a form to cover topics like this and to continue the discussion.

DHEC understands that and we look forward to seeing what the recommendations coming out of it will be, but as you saw we have had registrations since the last meeting that have over allocated streams. We are looking for short term fix, but we appreciate the planning effort and look forward to seeing the results and what comes out of it.

So much of what we are talking about is concerned with drought – I'm aware that this isn't within the scope of this workgroup, but I am troubled that there aren't any improvements to the drought management framework, and we are trying to put band-aids on it. So many major industries are located on main stems, if the current regime works well on those, it was probably developed with those big users in mind and I get the concern with smaller bodies of water. If we were to develop differential regulatory regime changes, I'm curious as to what it would look like. We want the regulation to reflect reality and the better we can do that the better everyone will be. The current calculation seems to work pretty well on big bodies of water.

The calculation works well on big bodies because there is so much water compared to actual use. How you get to safe yield numbers on those bodies doesn't change much due to the high volume of water. Existing large industries would not be affected, would be more for new users. Any other comments, questions, concerns?

We will adjourn the meeting, thank you again for bearing with us, I know this isn't the most ideal way to meet.

Am I to conclude that you (DHEC) have now concluded that a regulatory change is necessary? Any future meeting should be in person before any additional "report" or conclusions are reached.

No DHEC has not concluded anything at this point. I agree that in person meeting would be ideal. I think everyone recognizes that COVID is taking priority, but we do want to keep the process moving along.

We may be 12-18 months out to normality, need to keep moving along.

We had originally scheduled 4 meetings, but we can adjust if needed. We have not received a lot of comments from group about suggestions. If you have those please send them in.

Are you at the point where you would be ready to suggest a proposal?

I'm not sure if that will come out in next meeting, I know we need to have some internal meetings first. Still trying to gather possible ideas to examine. We are still in the data collection phase of this process.

Will you share the suggestions that have been submitted and share if you think they work or don't work?

Ideas that were submitted from the group have been shown, the one we went over today was from the group. We have only received one or two suggestions from the workgroup.

Any other comments?

With that, I appreciate everyone for taking the time to meet. Stay safe!

Safe Yield Meeting #4 Summary

06/09/2020

Everybody should be muted to keep audio calmer.

Just a reminder to keep your mic on mute unless speaking, use the chat feature to ask questions or raise hand to speak, and don't make funny faces if your camera is on because we can see you.

This is the 4th meeting of the SY workgroup. Welcome, I appreciate everyone's time, I think we got some valuable information out of the process.

Today we will go over:

The topic and goal of the work group

Update of new registrations in the Edisto basin

Review the alternatives that have been presented

Go over the feedback

Discuss the next steps

Then we will open it up for discussion

The goal of this work group was to evaluate how safe yield is currently calculated and to examine possible alternative calculations that the Department should consider.

This was really a group to try to get you guys to submit alternative ideas to consider.

As a reminder, any changes to the safe yield calculation would require a regulation change which is an entirely separate process.

We set up this group just to really talk about the safe yield calculation as defined by the reg. We tried to stay away from topics outside the box, outside the safe yield calculation. Topics outside the box are law changes, that's not what we were trying to tackle.

We have several new users in the Edisto basin that have affected safe yield in that basin. Previously, there was one small segment that was fully allocated, now due to new registrations this causes the stream to be fully allocated upstream of Cope. We are 0.71 CFS away from entire Edisto basin being fully allocated.

Just a reminder of different options we looked at; we did not get any feedback:

Monthly 10th Percentile flows (90 PE flows) – MIF

Monthly 20th Percentile flows (80 PE flows) – MIF

Monthly 25th Percentile flows (75 PE flows) – MIF

Monthly 40th Percentile flows (60 PE flows) – MIF

Monthly median – MIF

Monthly mean – MIF

MIF was the value used in law/regs, which is the 20-30-40 rule.

Current safe yield is one number that goes throughout the year, there are large portions of the year where actual gauge flow exceeds safe yield calculation. We compared pros and cons with current formula to alternate formulas.

Looking at different formulas compared to gauge flow, 90% drops safe yield substantially and incrementally comes up as we change the formula from % exceedance to MIF to mean.

Comparing various formulas to actual gauge flows.

We hoped to get feedback from group about the different formulas. Lance put together a feedback form. We had previously asked for written comments but decided on more standardized form.

Response rate was fairly low, only had 7 responses.

Presentations will be available on the web after the meeting.

Had some free responses, I'll read through these.

"I feel the state should wait until other working basin groups have completed their work before we proceed with any new recommendations. The problems/issues with water quantity have not been fully documented on a state-wide basis to warrant any changes at this point."

"This was a great demonstration of why calculations are meaningless when a major class of user is exempt from regulation. At an absolute minimum, ALL users should be held to an instream flow standard."

"The original law was never intended to guarantee that any stream segment would have water flowing in it all the time. The law was meant to allow some use of the water and during low flow periods, those withdrawing water should employ drought management practices until it rains again.

After learning/confirming that A: Because of exemptions and grandfathered withdrawals less than 10% of withdrawers actually have to observe the "protective" measures found in the SWWA. and B: There is a disconnect between the "20% of mean flow must remain" in the enabling legislation vs the "80% of the mean flow can be withdrawn" in the regulation, so the putative "minimum instream flow" protection is essentially meaningless as applied. These two facts alone make me reluctantly conclude that merely tweaking the "Safe Yield" formula would not achieve the level of change needed to adequately correct the obvious deficiencies in the status quo. (For this reason, I was unresponsive on the questions relating to the MIF variations evaluated. Since not answering at all wasn't allowed by the survey tool, I selected "no difference" for all, based on my understanding that whatever we might tweak will NEVER be extended to affect the vast majority of permits, or any existing registrations.) The exercise has been informative and enlightening, and is much appreciated, but I do not see a quick, easy, effective remedy to the problems that concern me embodied in the information that has been developed thus far."

"I don't feel comfortable answering first 6 questions. Answering first 6 questions won't help. Asking the right questions and then looking for answers is better way. I know you guys have tried to help to the extent you can. I'll say what terrifies many: bad policy, bad law, need to lay ground work (use real basin stakeholder groups & not just usual suspects) to change law. PPAC may be best avenue to do this. Safe yield as defined or determined by SC regulators, while with the best of intentions, is dictated by Gen Assembly decision (law) which in essence attempts to make water demands, stream flows and water supply a political decision rather than a science/engineering decision with real and historical evidence that should drive science. That said, we live in a political world. Surface Water Withdrawal Permitting law was simply bad policy. Until bad policy is replaced with good science, nothing else really matters. When multi-decade droughts occur (and they have repeatedly occurred), mega drought won't care about politics or law. Get back to basics. How much statistical safe yield do we have in each basin (segmented and not based a simple model)? What are

segmented basin demands over next 100 years? What is the gap? What do we do about it (conservation, IBT, new supplies...)?”

“I did not complete question 8. I strenuously object to this questionnaire. This reduces the entire stakeholder process to a vote on multiple choice questions and prioritizing topics not discussed. It now appears that with a single anonymous alternative proposed, the Department took it upon itself to develop other potential alternatives. The Department presented information that only one stream segment (<3 mi.) in the entire State was fully allocated; thus, no substantial justification for regulatory changes was presented.”

Thanks for bearing with me while I read through the free responses.

What’s next?

DHEC will produce a summary document of the Safe Yield Workgroup process. (Mid-July)

DHEC will internally evaluate information that has been collected during this process and develop a plan to move forward. (Remember any proposed regulation change has its own process) Workgroup members will be notified once a decision is reached.

I just want to remind everybody that if any reg changes were suggested, that is an entirely separate process. With that said that’s the entire presentation. We can open it up for questions, comments, and discussion.

Can we submit some written comments up to a certain due date on this?

We can accept further comments, lets do until a week from today. Unfortunately, this process has already been stretched out due to COVID and we would like to get started on the summary report.

Lance can we open the survey back up?

We can open the feedback form for a week from today as a place for comments and responses/

I just wanted to make sure you got the comments we submitted back in May.

We did, we received several written comments not on the feedback form, we will include those as part of the report.

I don't see any type of agreement or consensus on any changes right now. Trying to get understanding of where we will go from here.

Summary report will not have an outcome or decision, just a summary of items that have been discussed. We will then discuss and evaluate internally to determine next steps. I did not anticipate this group coming to consensus, this group was designed to get different viewpoints from different stakeholders.

I was struck by the fact that you are now showing a big chunk of the Edisto in red indicating full allocation. What's up with being almost fully allocated south of Givhans Ferry?

Due to new registrations that have come in we went through the process of determining when permittees would not be able to withdraw their permits during normal flow times. This was different due to the scale of the Edisto.

We have been saying allocating more water than is actually there would be the outcome.

We have gotten 5 large registrations in the past few months leading to a significant portion of the basin being allocated.

Where do we go? What does this mean moving forward?

Currently if someone came in with a registration upstream of Cope, they would not be able to get a permit or registration.

So, this is a dynamic situation based on the information from the feedback form.

Safe yield is a snapshot that changes as new permits and registrations come in. We have been talking internally about having maps on the web readily available in order to show the information without having to write a full report.

I know the group talked about this during the first meeting, but it seems that the concept that the genesis/origin of the law has been lost, the groups that were involved, environmental, power, resources, etc., were left with the dilemma of is a law better than no law, is permit better than no permit. If the powers to be did not agree with the concepts of grandfathering in and agricultural registrations whereas if the law didn't exist, the withdrawals would be being used anyway. Seems like the history of how the law was developed needs to be added to report. The law wouldn't exist without agreement on the two compromises. What would be conditions for today? Other comment, change the

law/reg, everyone is rushing to reserve water but not rushing to build intakes. Put time limits on permits, if they don't construct within a certain time they lose their allocation.

Currently the reg states that if not constructed within one year we can review, but they can then just resubmit another request.

Is that something that can change in reg or is that a law change?

I believe that is spelled out in the law, but I will check.

If they have existing reg and you change the law would they be grandfathered?

I'm not an attorney and cannot answer that. Will have to leave that to the attorneys

I would like to see, for the Edisto, a shapefile that shows the watershed and how it is allocated under various safe yield formulas. This group wasn't formed to gain consensus but if a law or reg change is going to be pursued we will need consensus. Seems to me that we see these problems on relatively small streams. I would like to see how this works, leaving the main stems under the current calculation and so we can see if there is a path forward for grandfathered holders. I think it has the advantage of better reflecting reality.

We will evaluate and look at how its calculated, see if it would make sense to split up main stem opposed to headwaters.

It seems like the surface water process was intended to authorize uses where safe yield is available, and where segments are fully allocated, not authorize additional withdrawals. Does DHEC believe that the program was intended to ensure that no segment is ever fully allocated?

No, I won't speak for what DHEC believes but I'll speak for what Alex believes. This was not developed to ensure that no segment is ever fully allocated.

Couple questions. For the new registrations on the South Fork, are they brand new or existing that are just now registering?

We cannot ask that, can only ask where and when. We evaluate that they have access to the river.

If the basin is essentially fully allocated, isn't that a sign the current law is working? Nobody else can come in and drop another intake to take water that isn't there.

The use on the basin is not nearly what is permitted or registered on the basin. While it is legally tied up, there is actually water there.

Isn't the basin better off then with the law than without the law?

That is a value judgement as to whether it is better. When evaluating we have to assume everyone is withdrawing the max amount from every user.

Any other questions?

We have people applying for registrations for a lot of water without intent to use it which limits other users from using this. I don't think this is how we should be managing our resources.

I agree, if it's over allocated then the current law is at least somewhat protective.

My point isn't that it is an over allocation issue, it's that people are working the system to reserve more water than they need that may be needed by someone else in the future.

Does this create situations where people can negotiate access to water allocated to other permittees?

If two entities come together and an agreement is met outside of the regulatory framework, the Department would not be involved in that.

So, what is to keep anyone from going to the Lynches basin with property on the river to apply for a registration and take up all the safe yield above them. Should we expect more of this?

I anticipate we will see more of this.

Anyone else that wants to chime in?

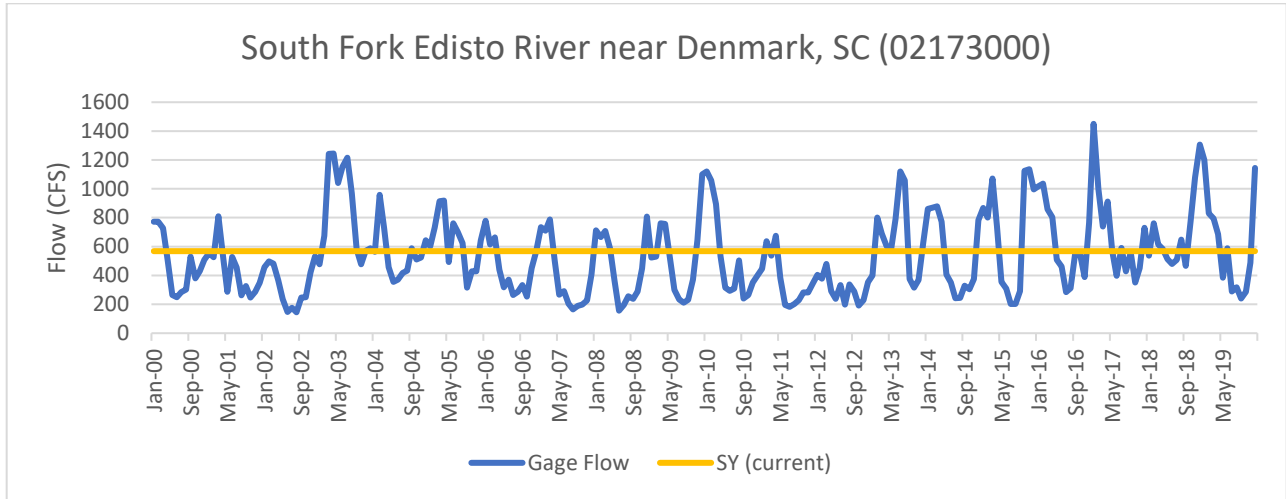
If not, thank you everybody for your time, I think this was helpful to get multiple perspectives on this issue. We will try to keep everybody informed as we move forward.

Thank you for the time and effort that you put into this contribution. Our report will focus on how to better the permitting process and to better the safe yield calculation under the current law/reg. Thank you for your participation.

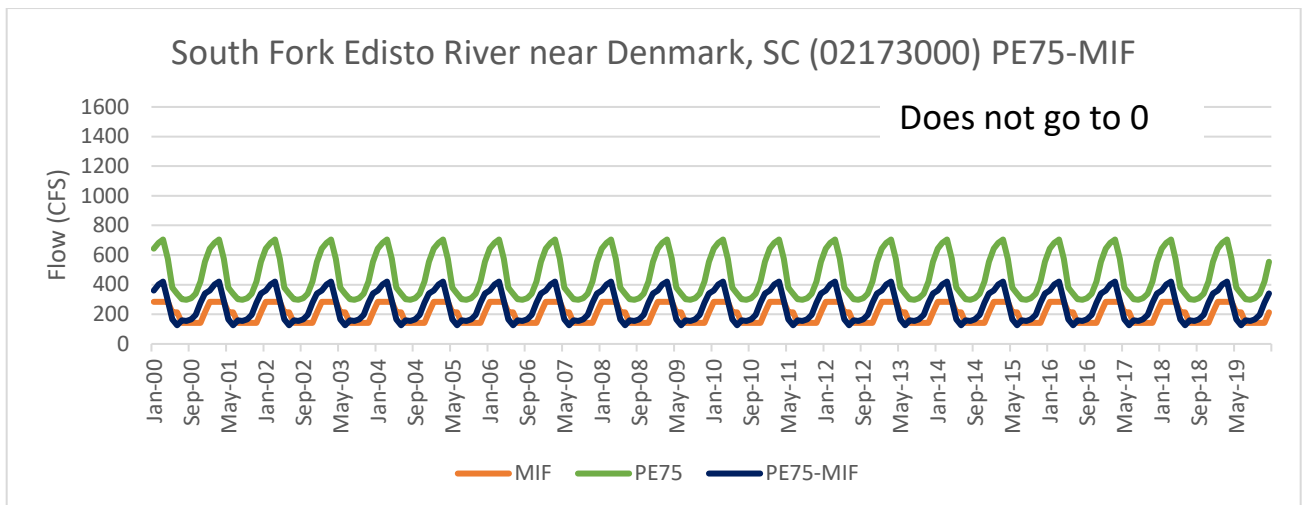
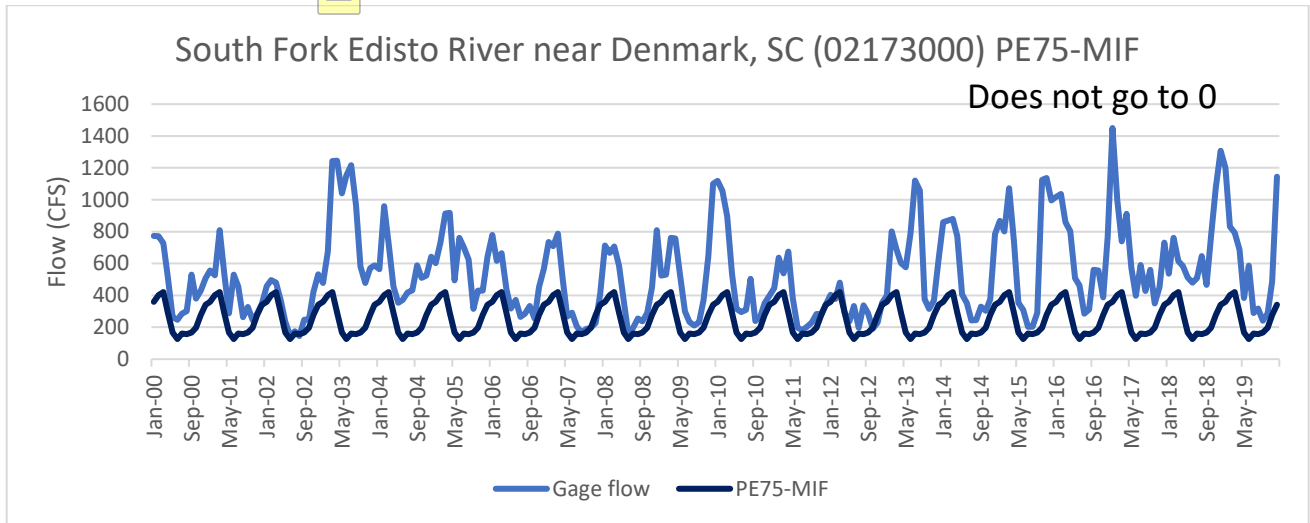
We will send out the meeting presentation and get it on the web as quickly as possible. We will also reopen the feedback form and open for comments for a week from close of business day today.

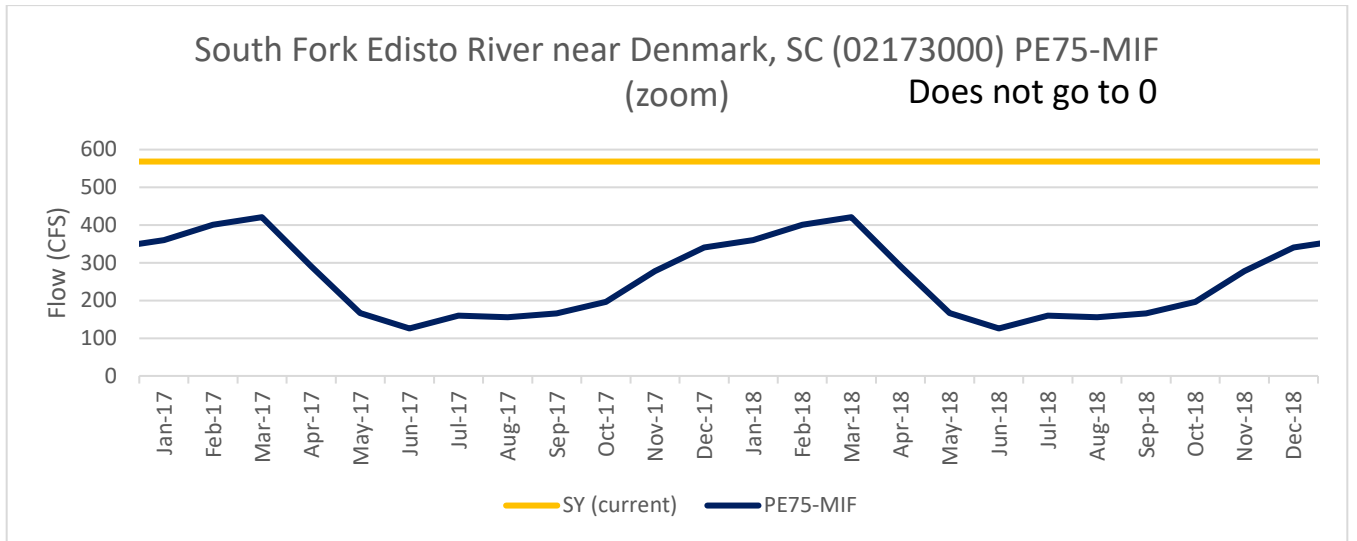
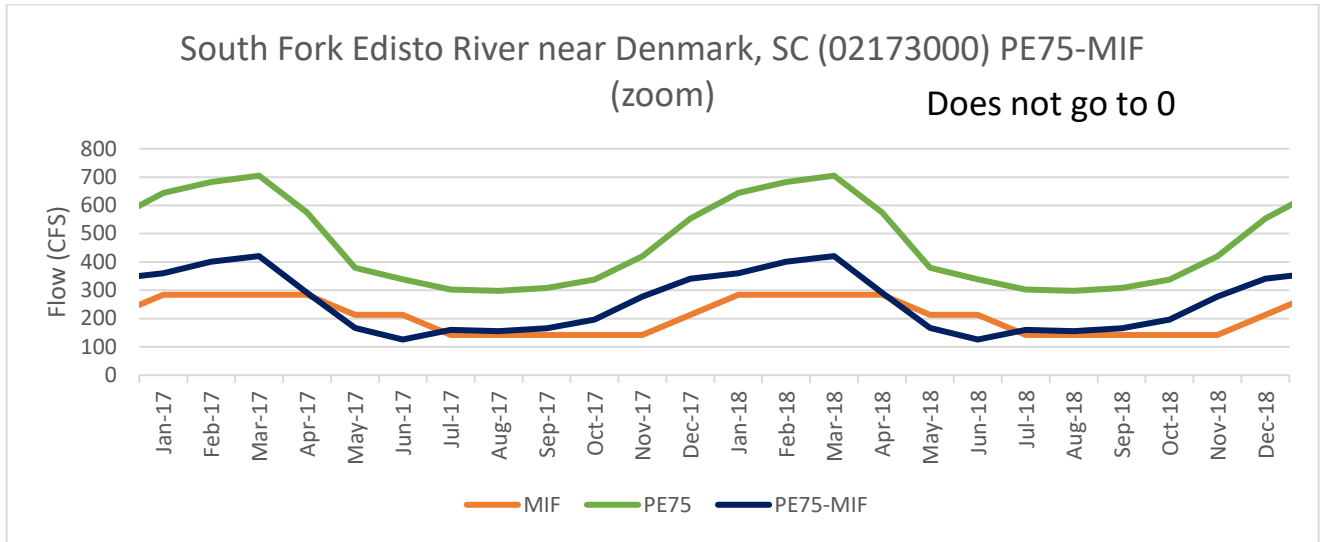
Appendix B

South Fork Edisto River near Denmark, SC (02173000)

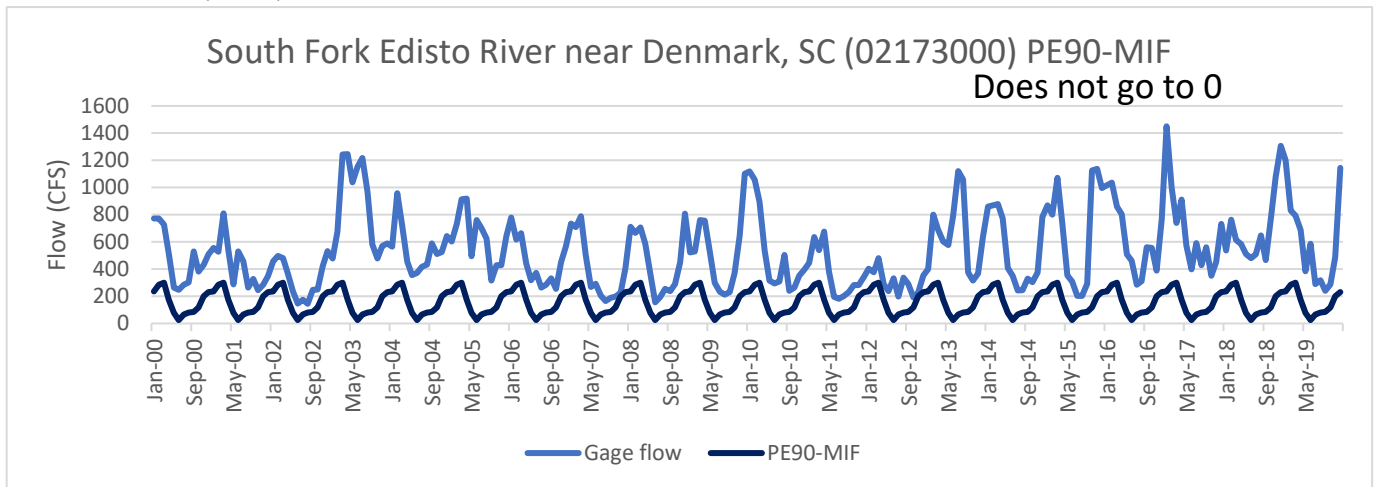


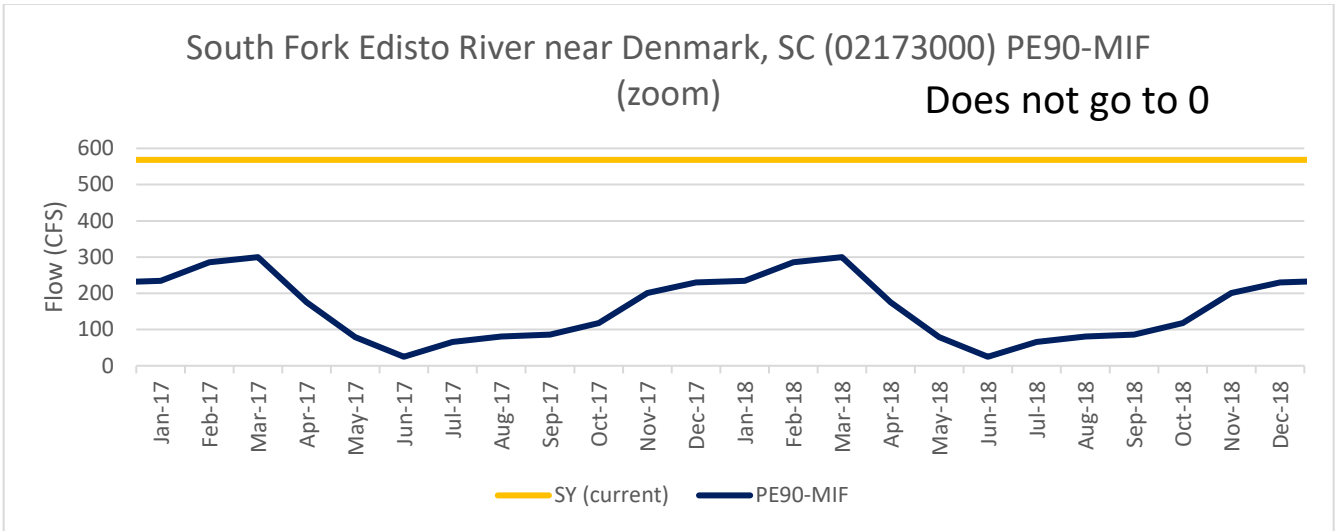
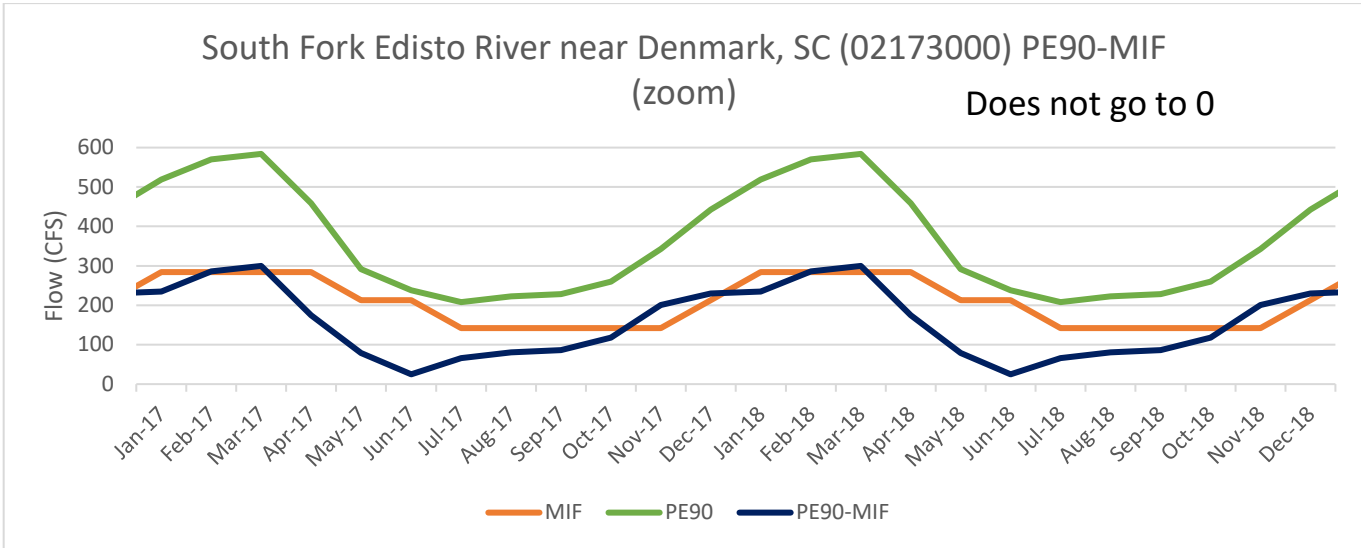
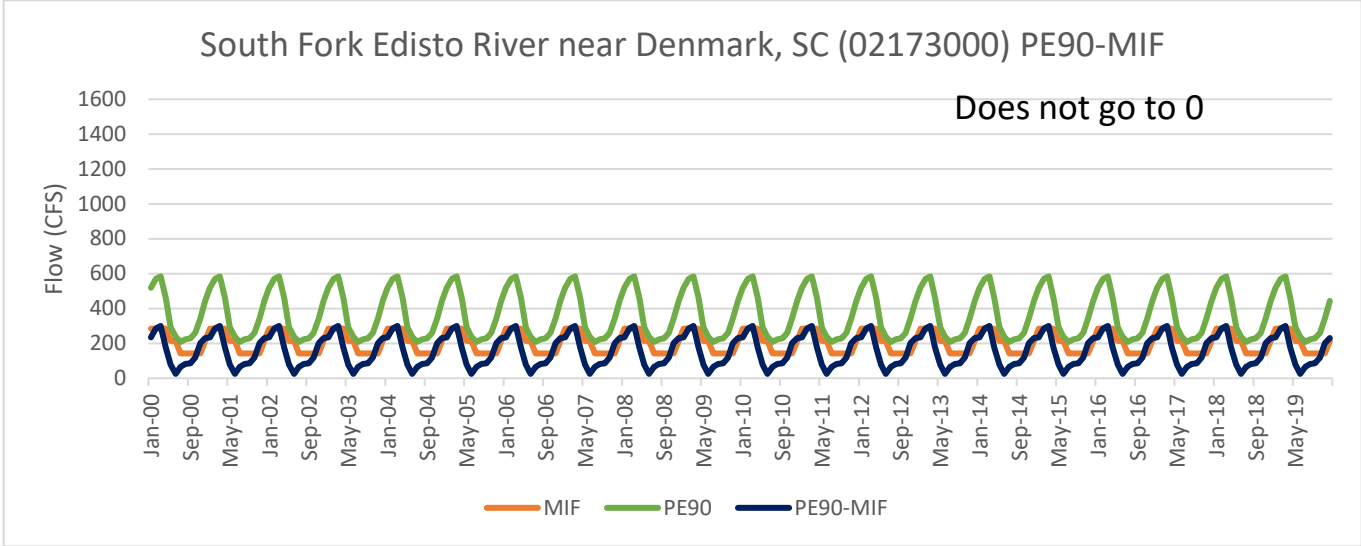
25th Percentile (PE75) – MIF



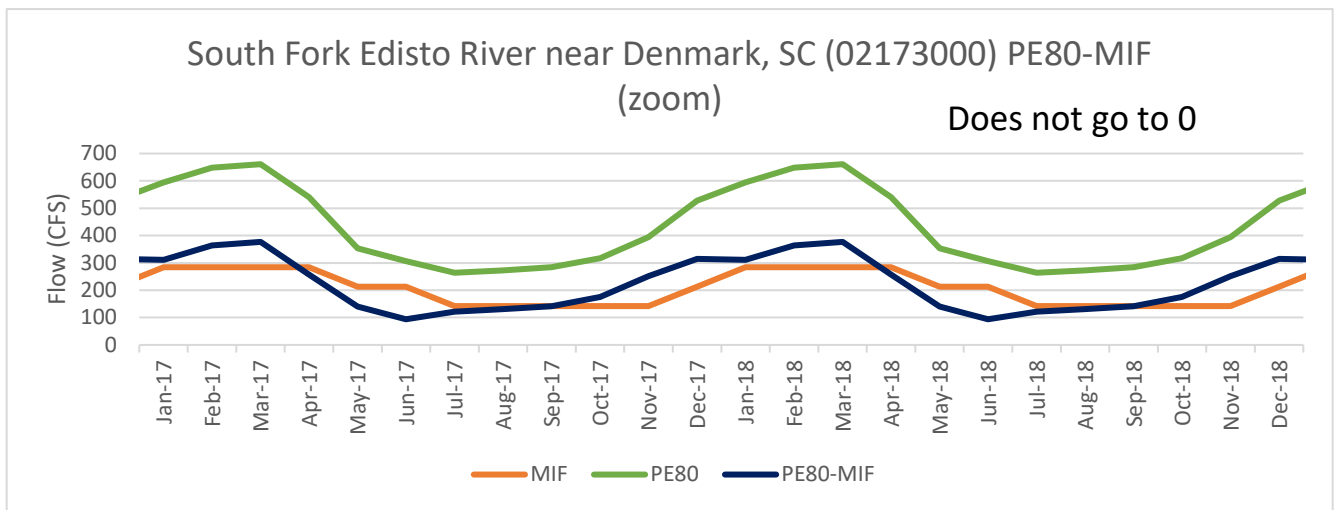
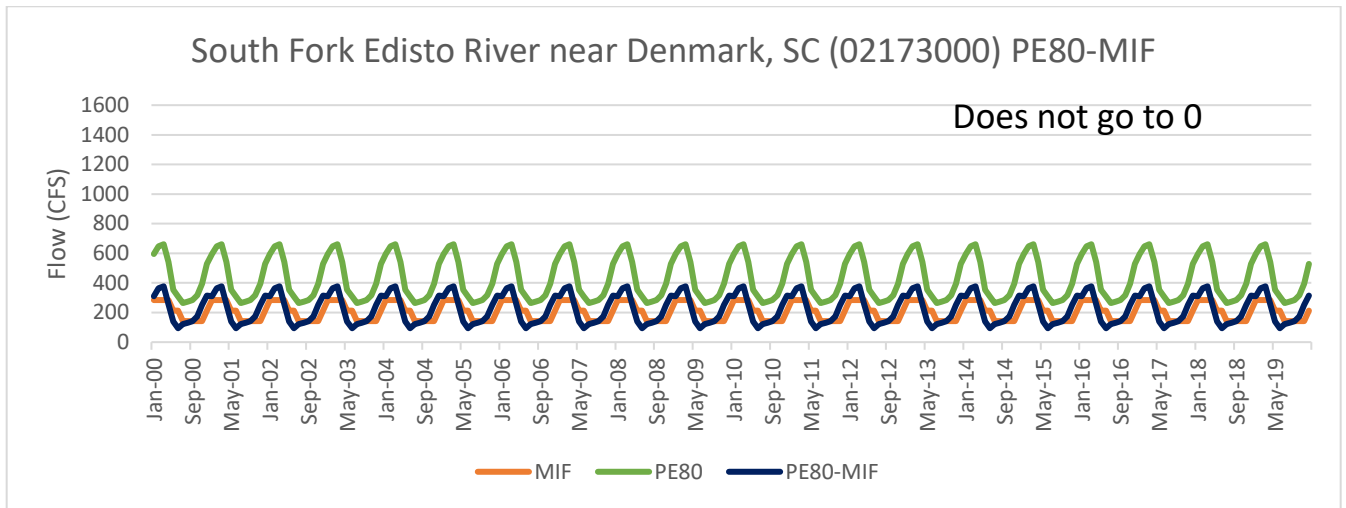
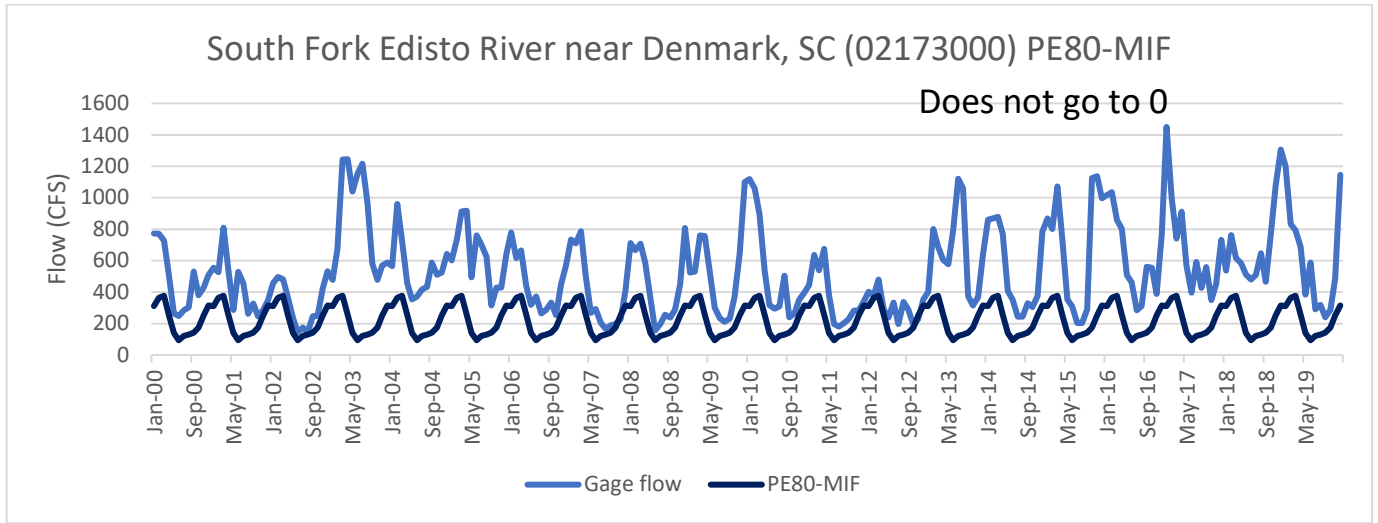


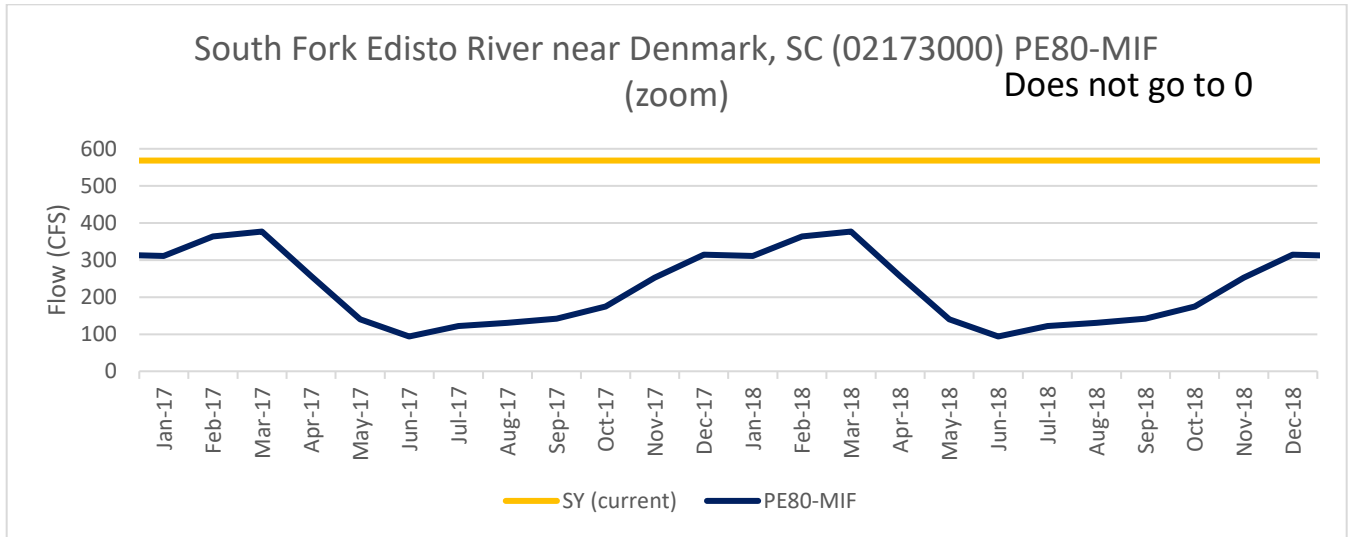
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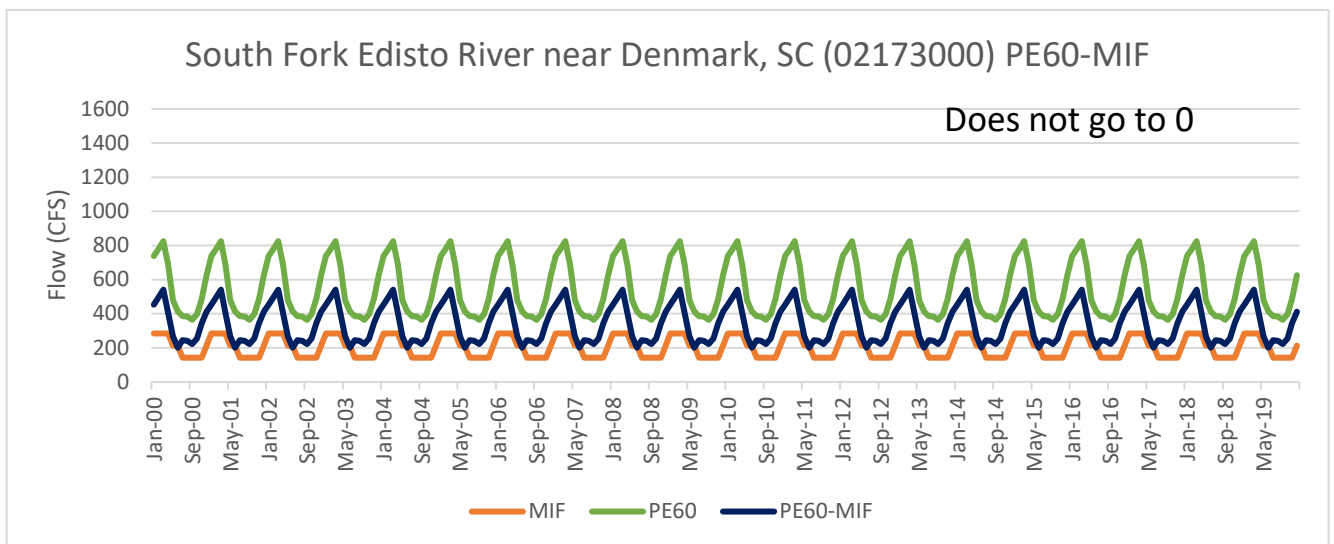
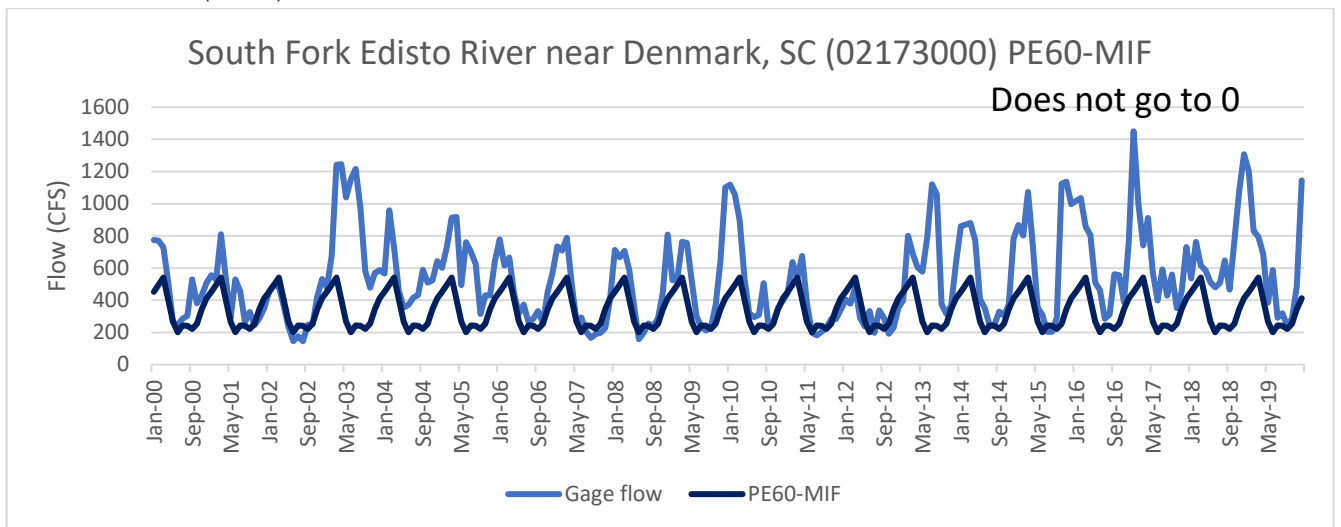


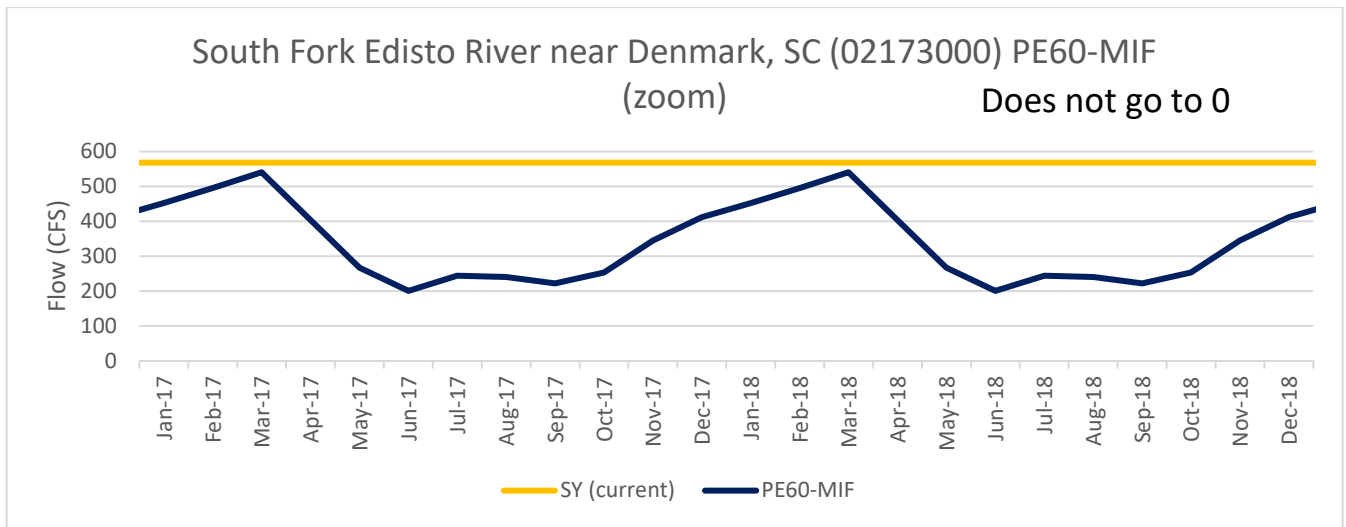
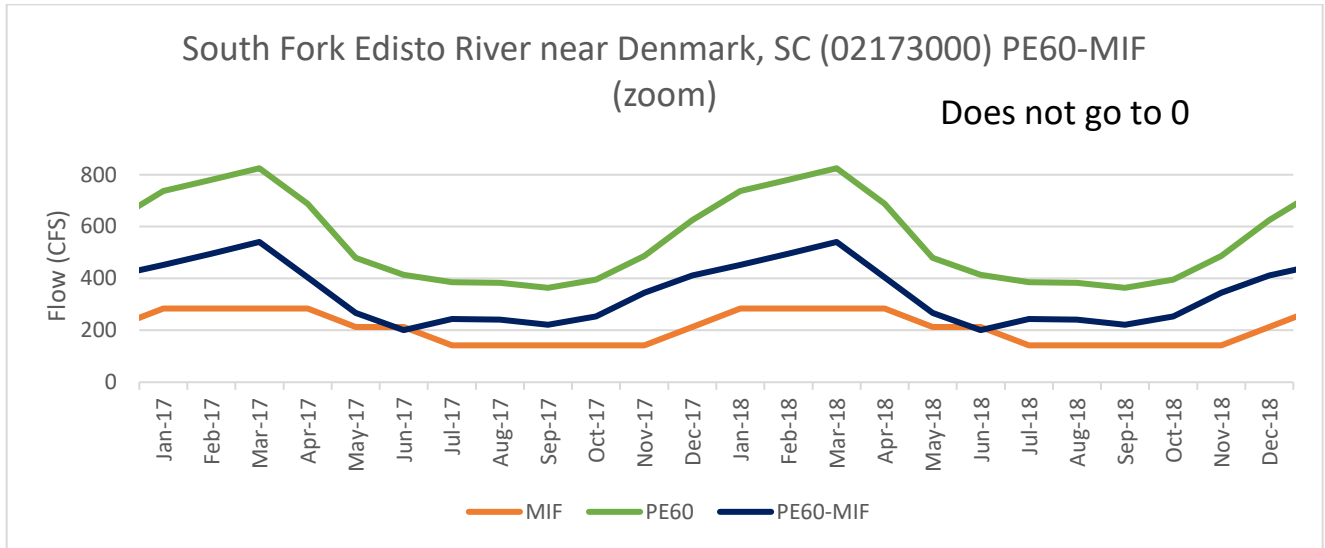
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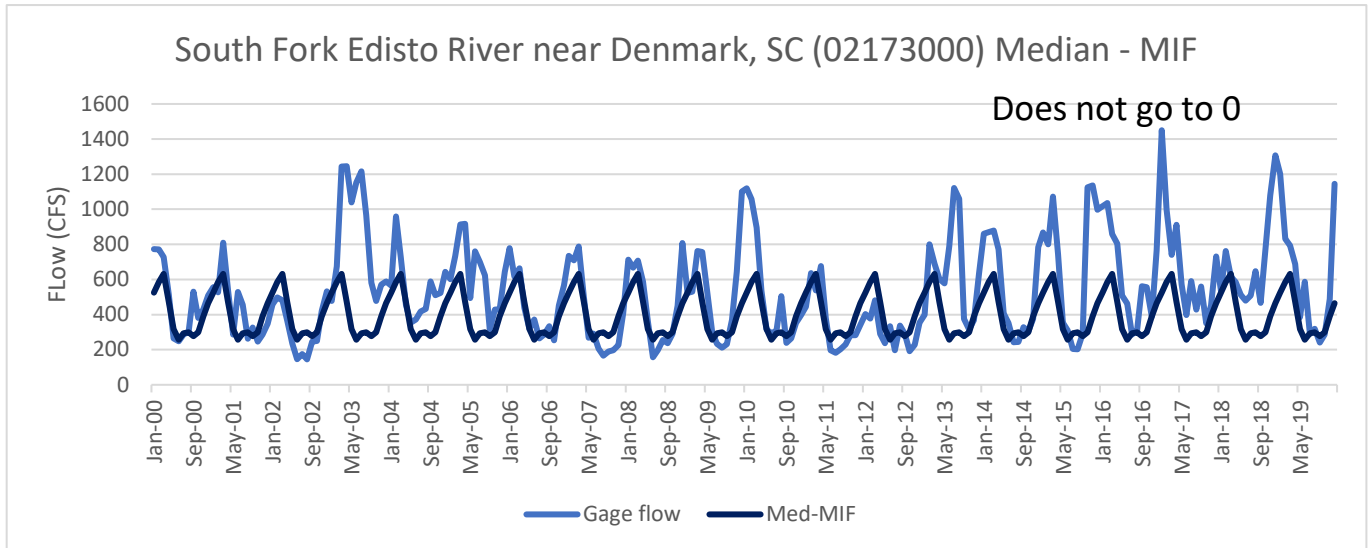


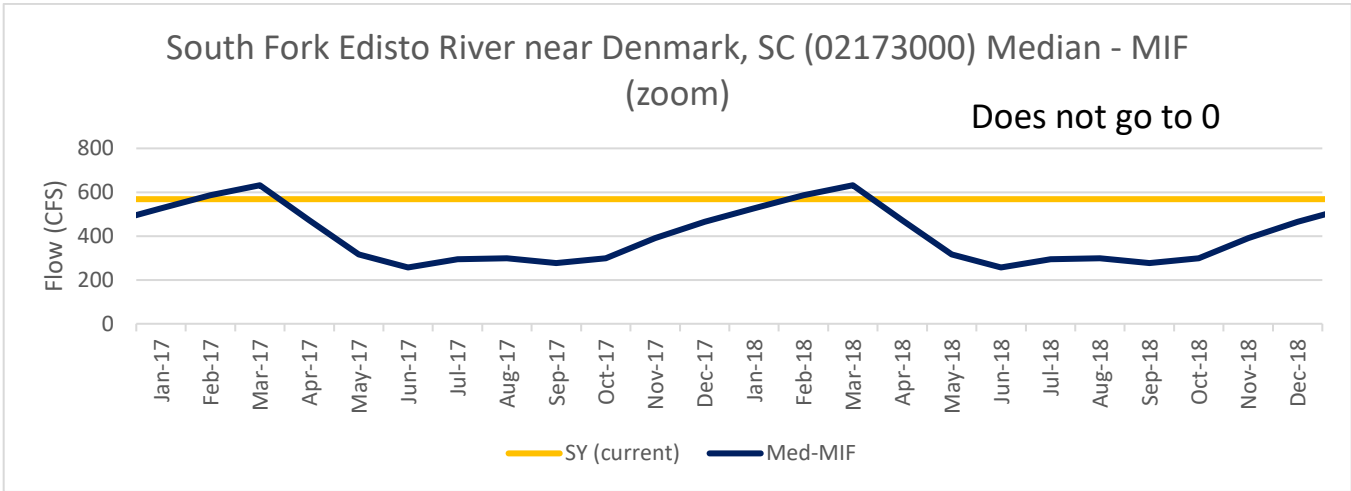
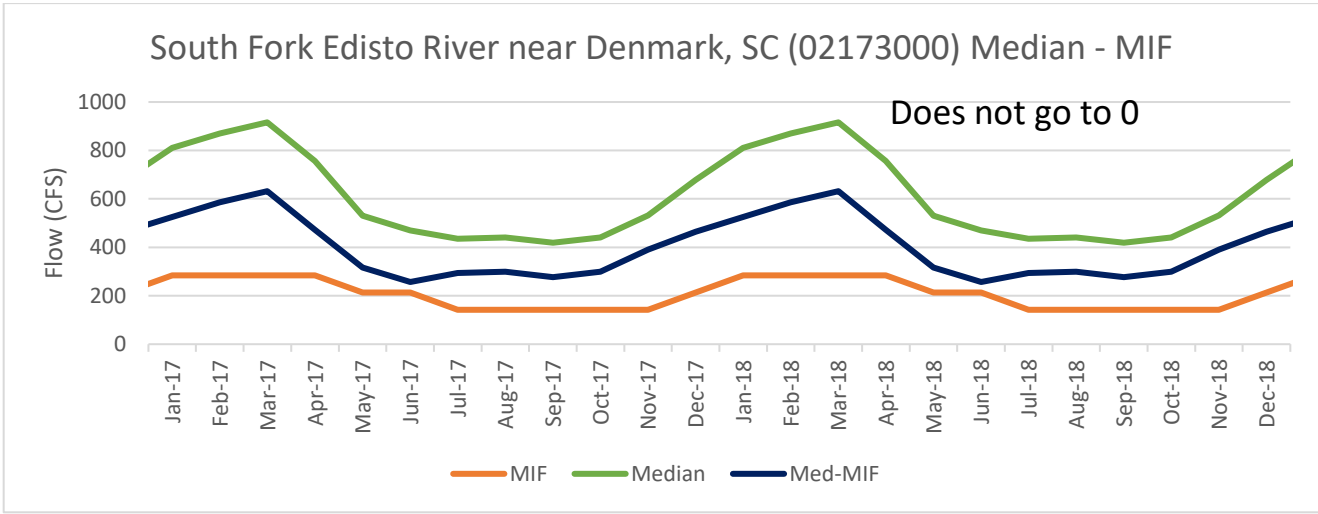
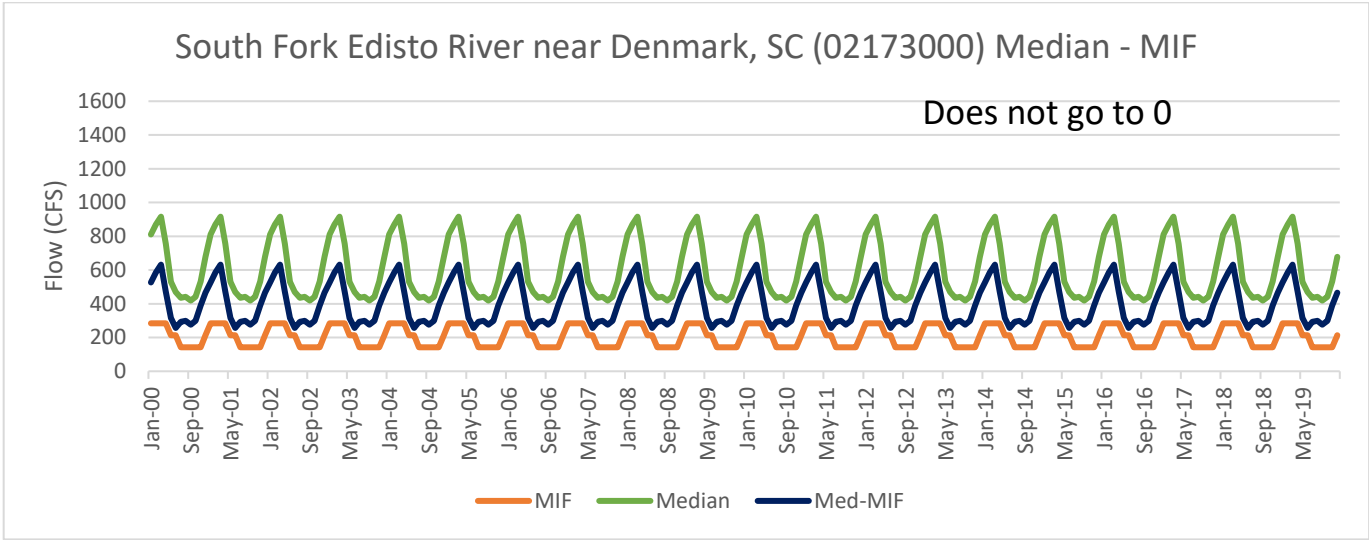
40th Percentile (PE60) – MIF



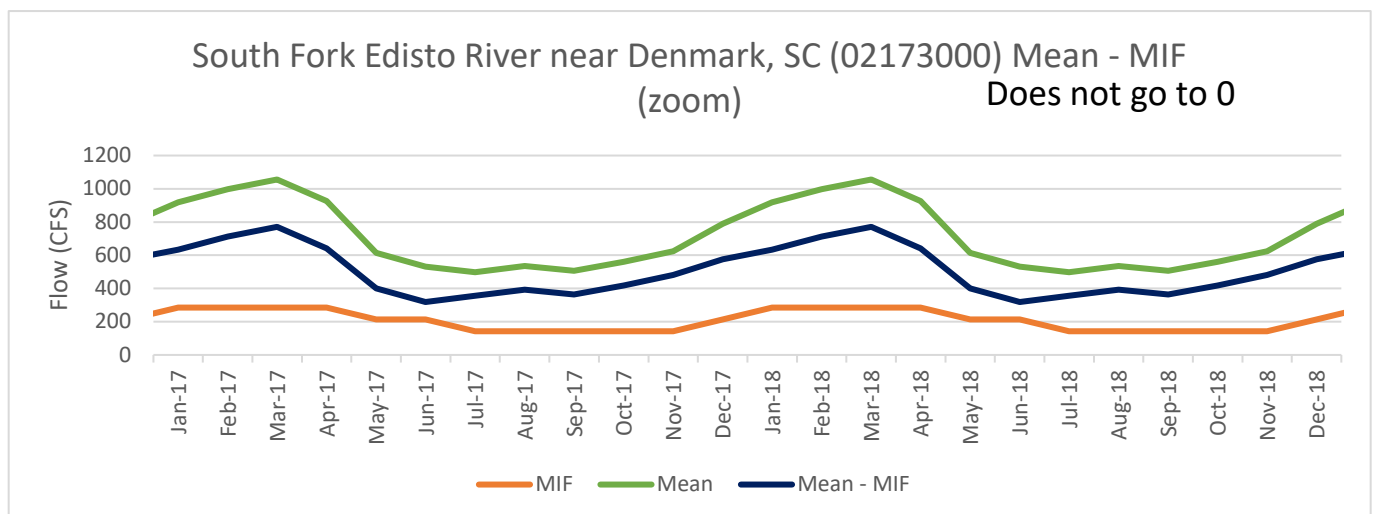
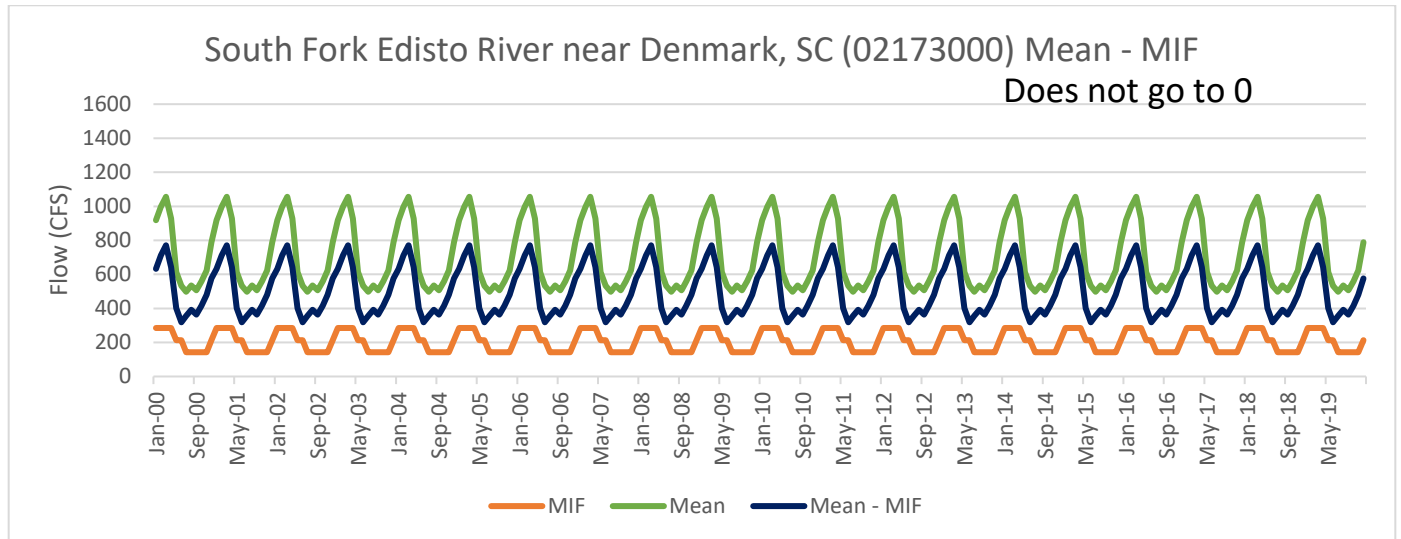
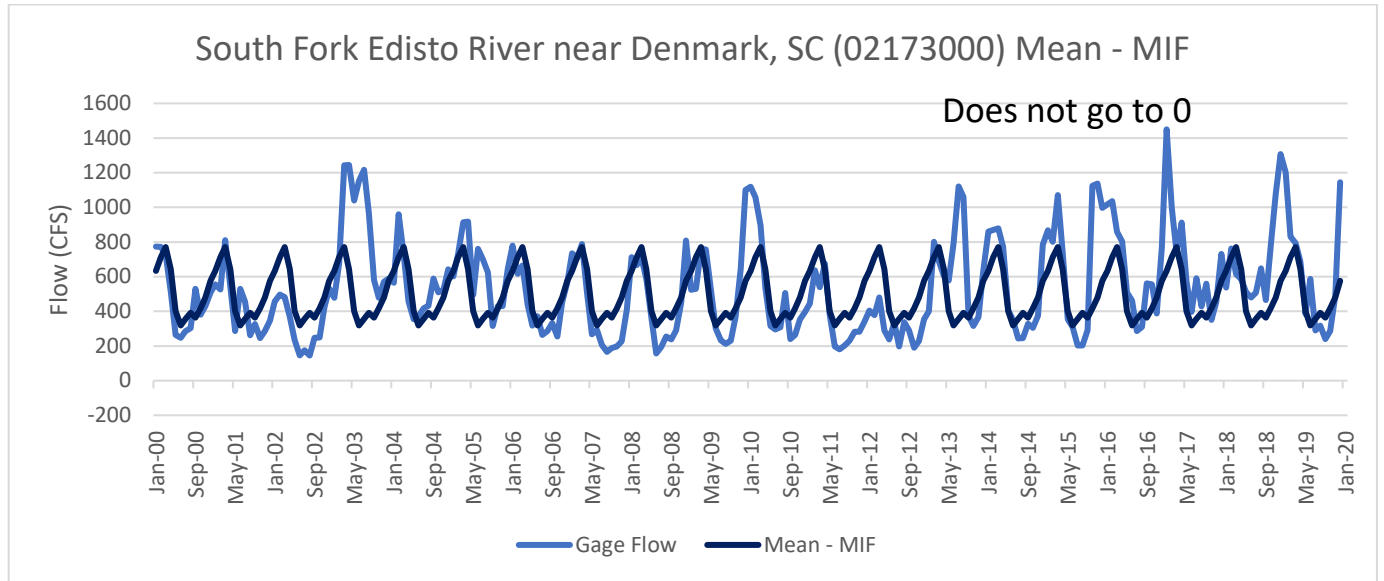


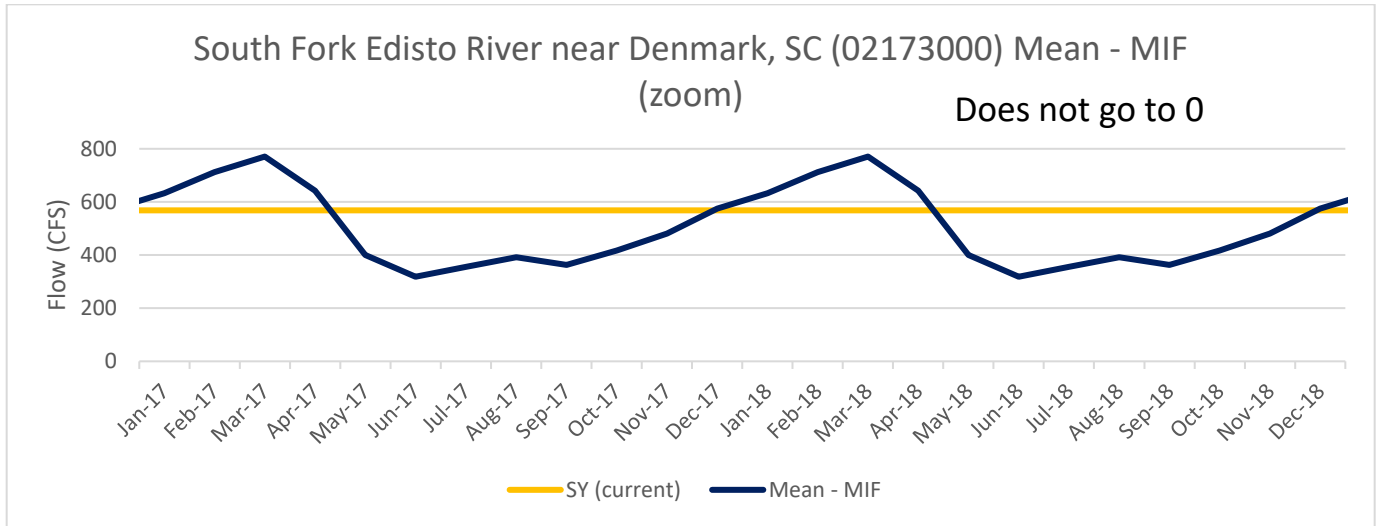
Monthly Median – MIF



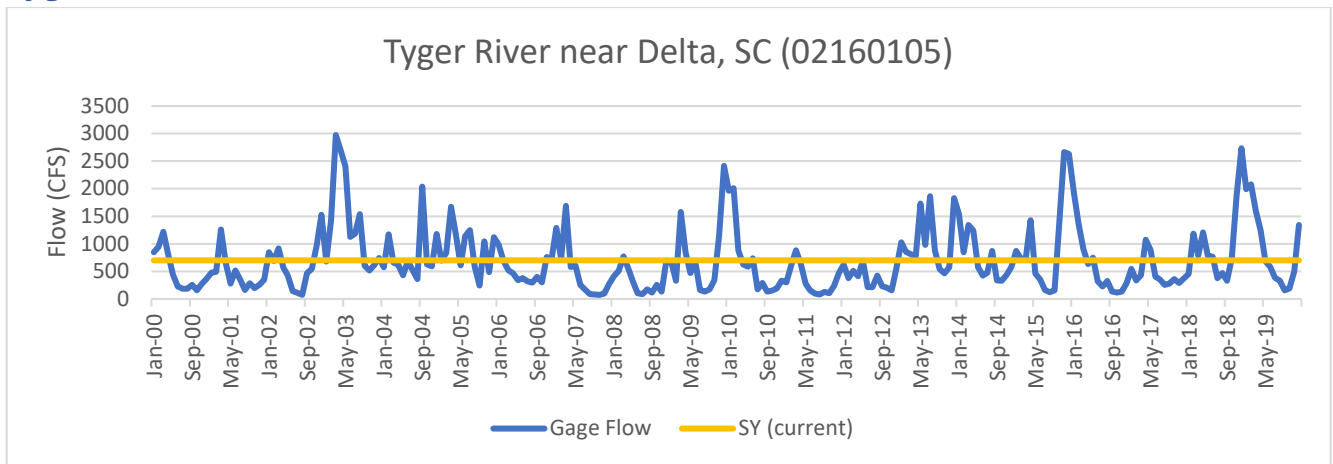


Monthly Mean – MIF

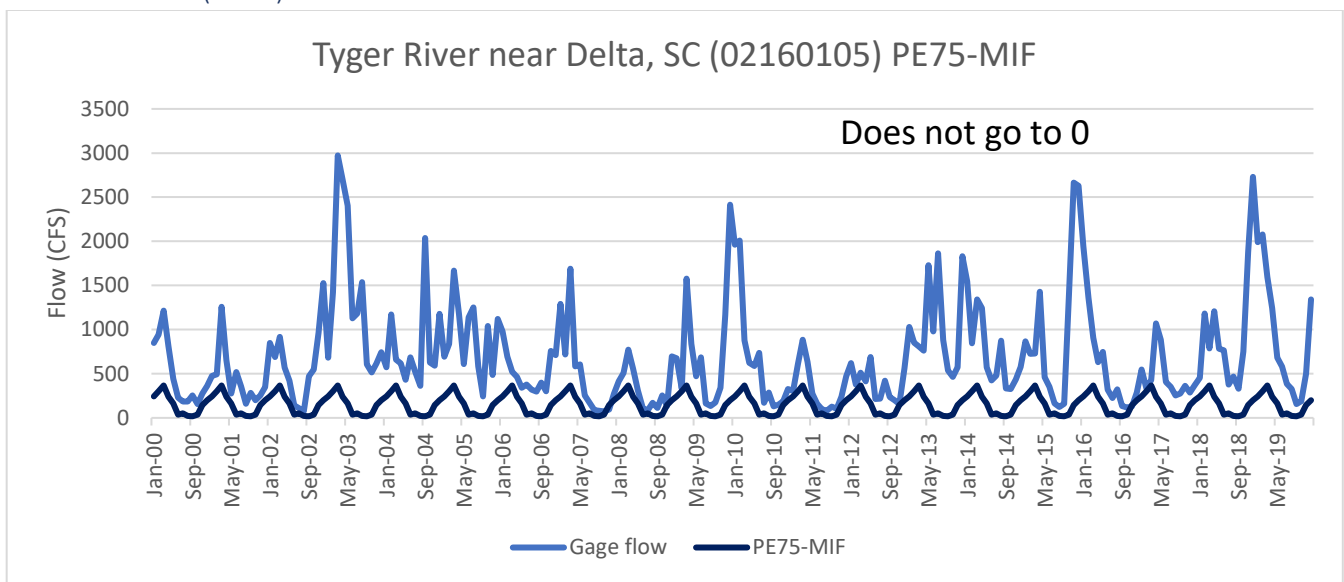


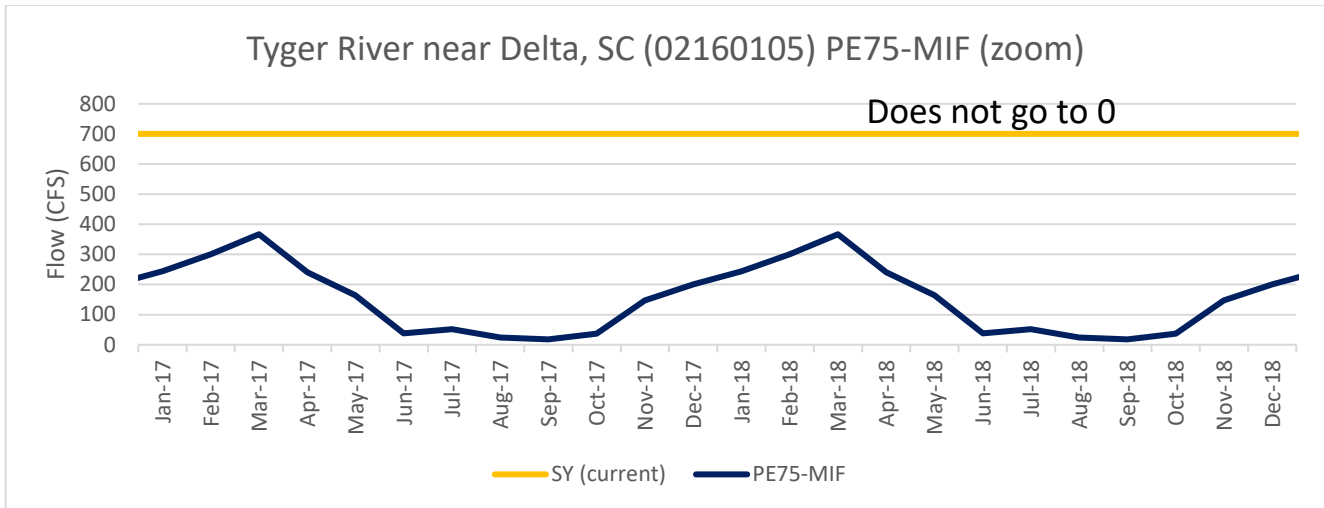
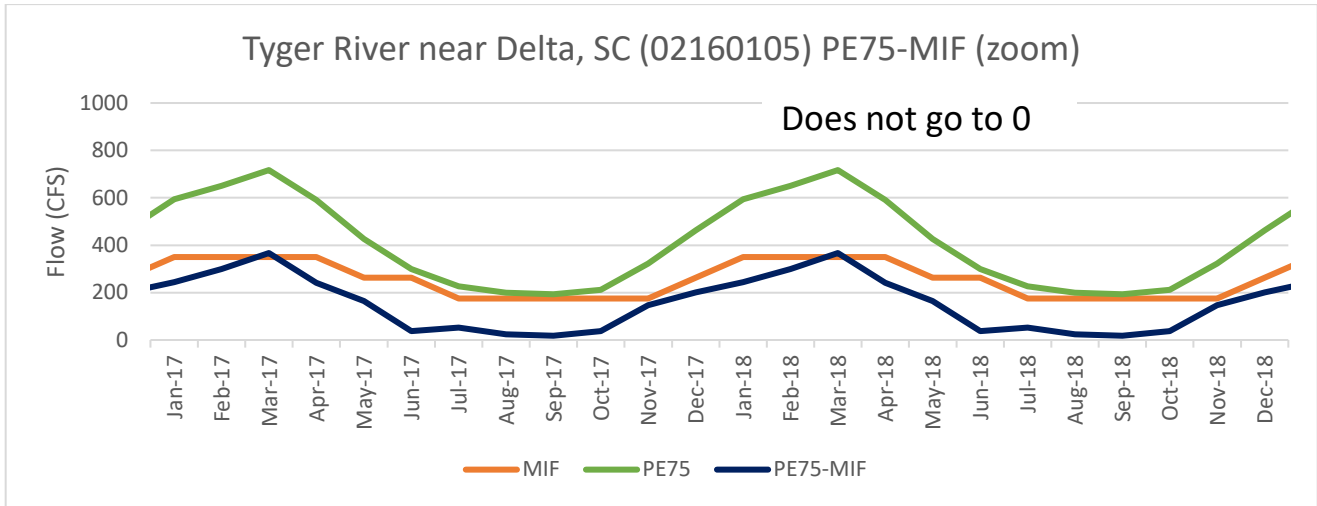
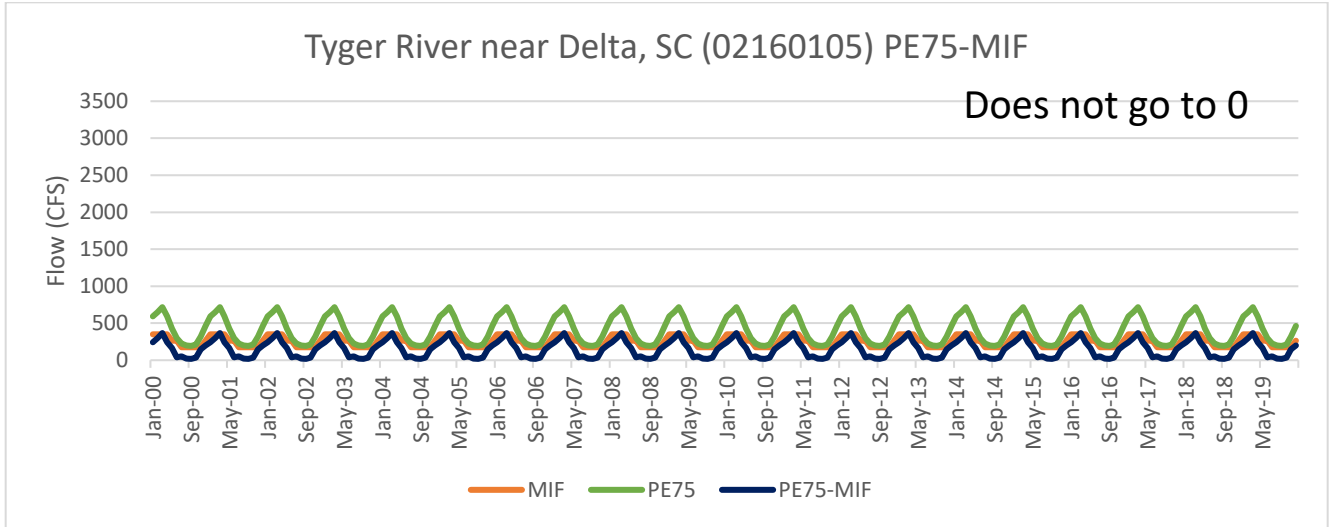


Tyger River near Delta, SC (02160105)

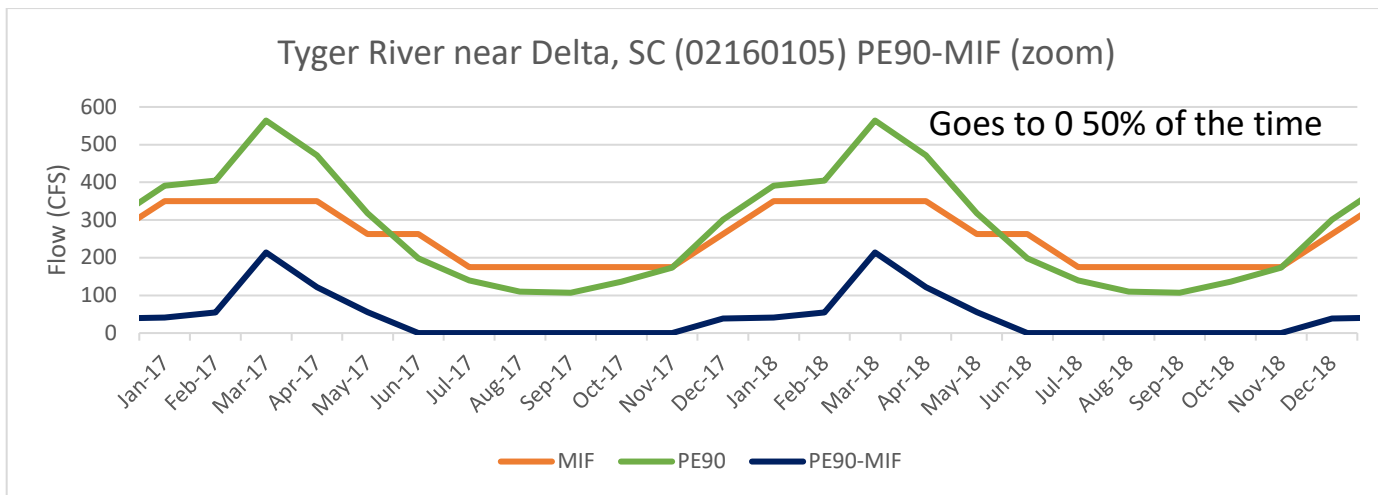
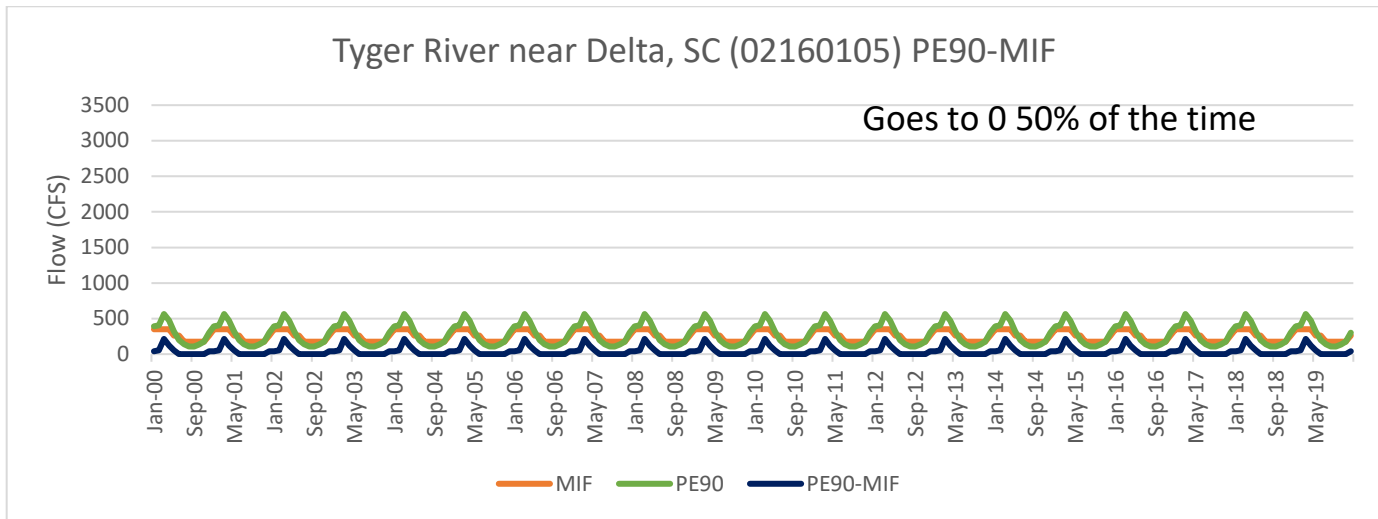
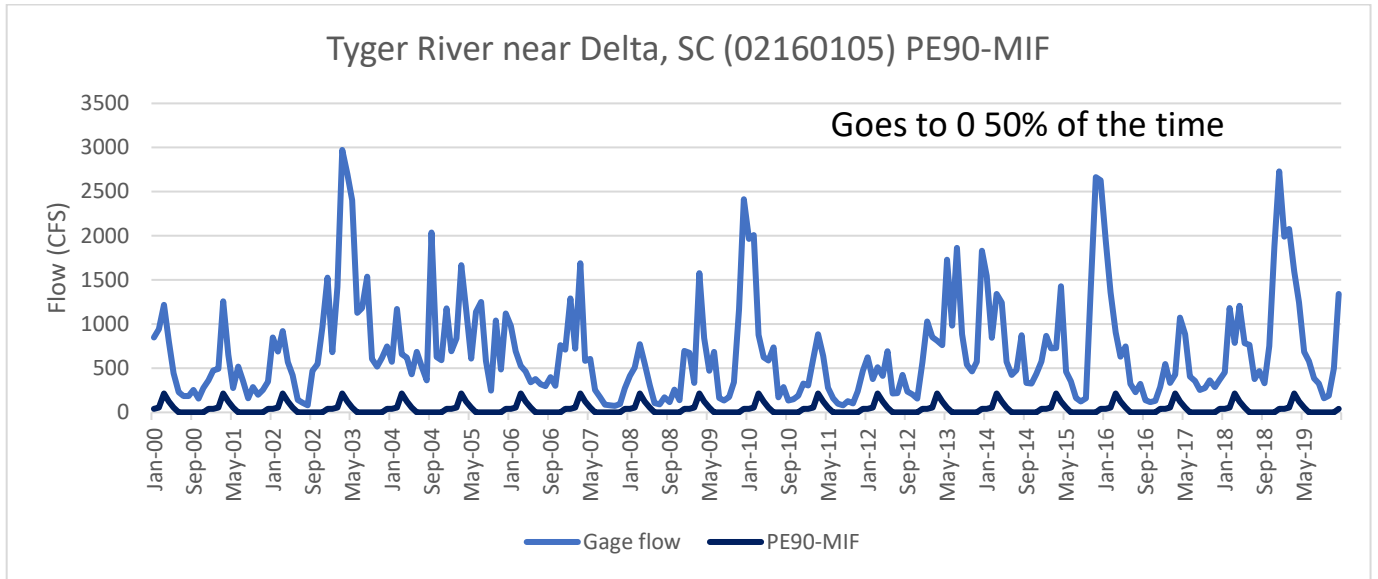


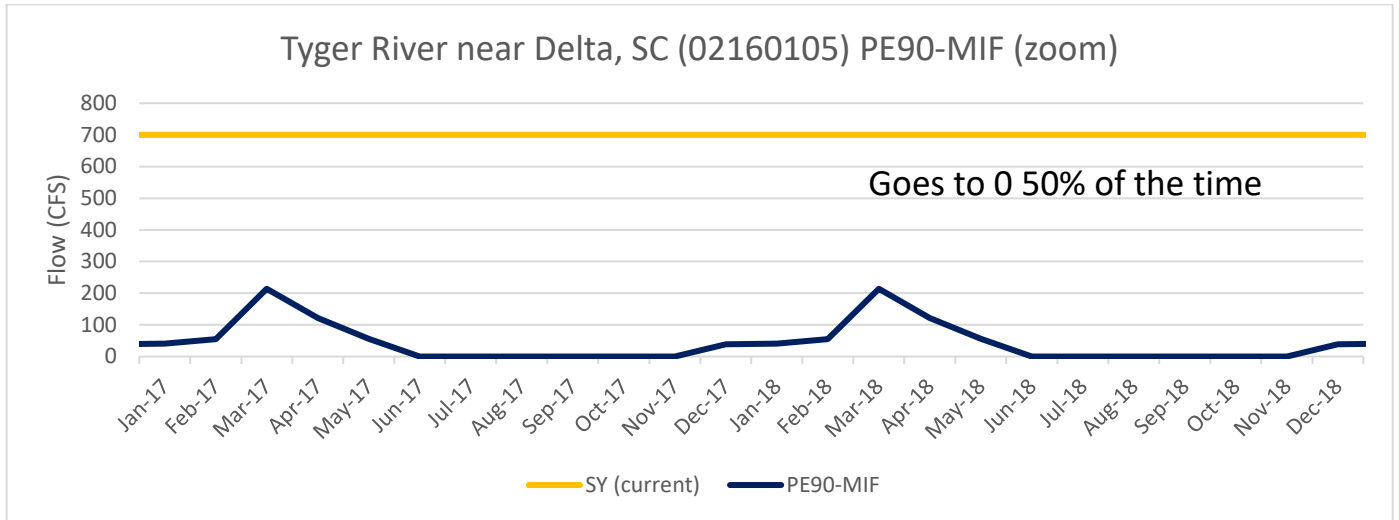
25th Percentile (PE75) – MIF



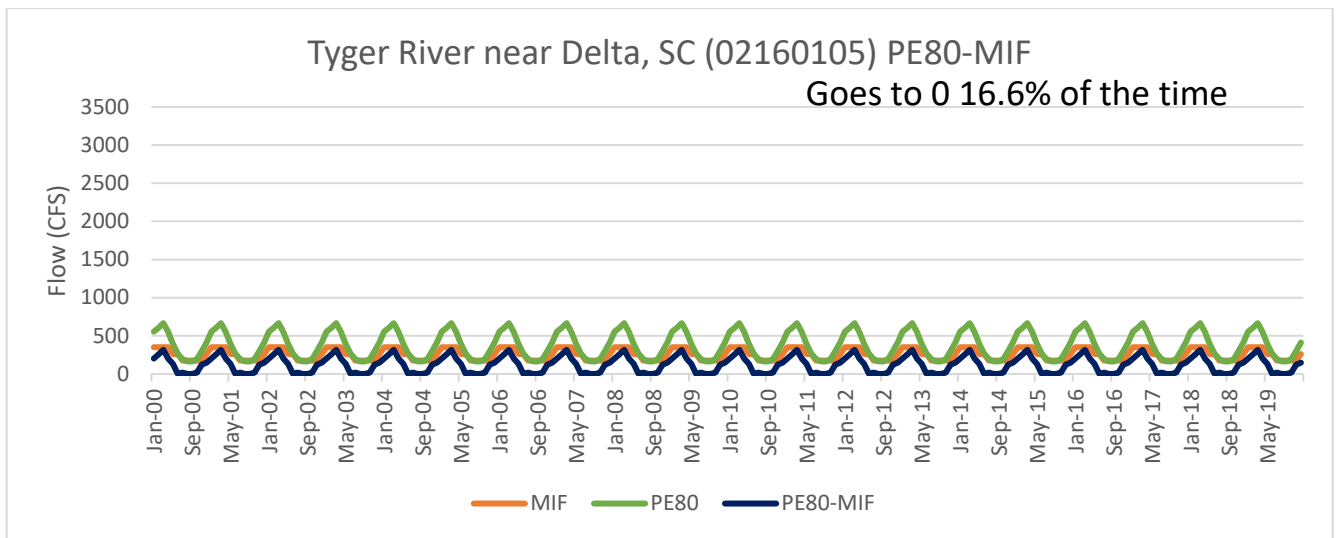
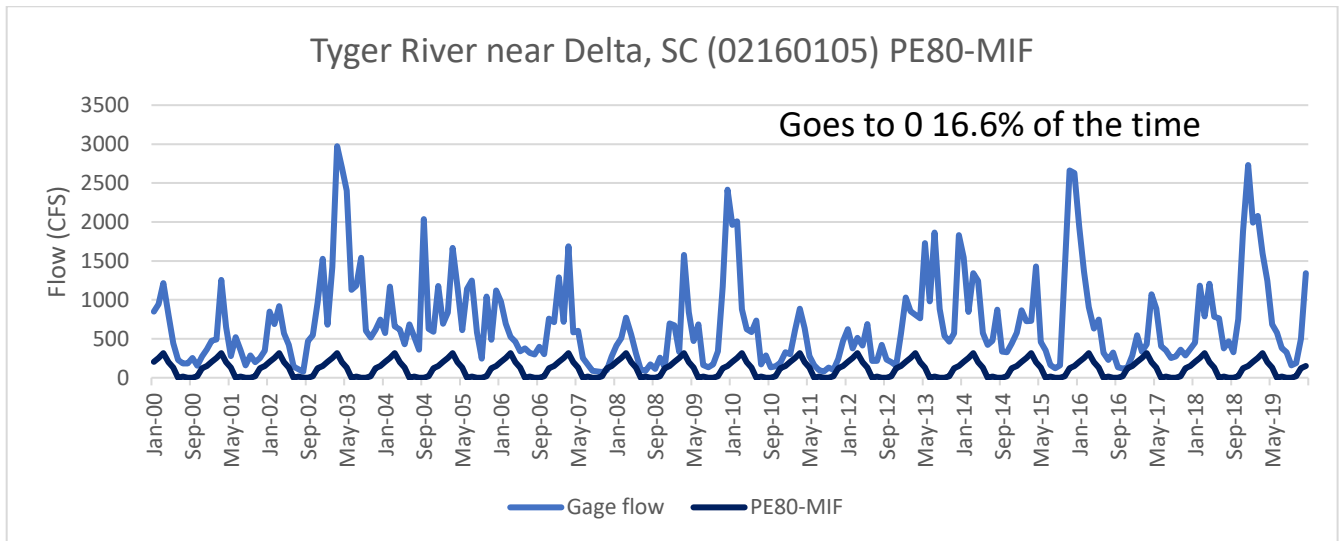


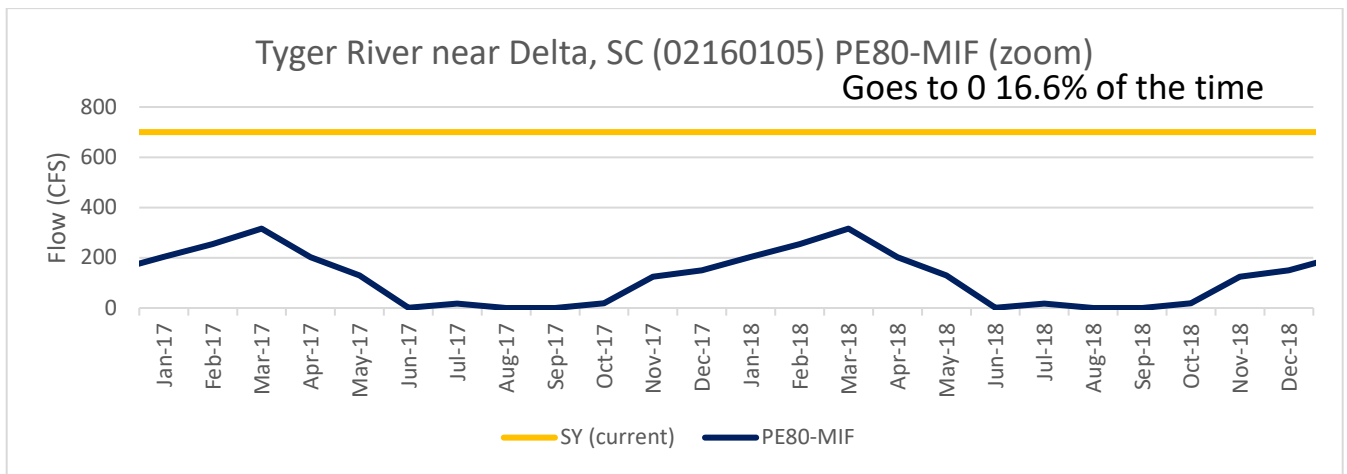
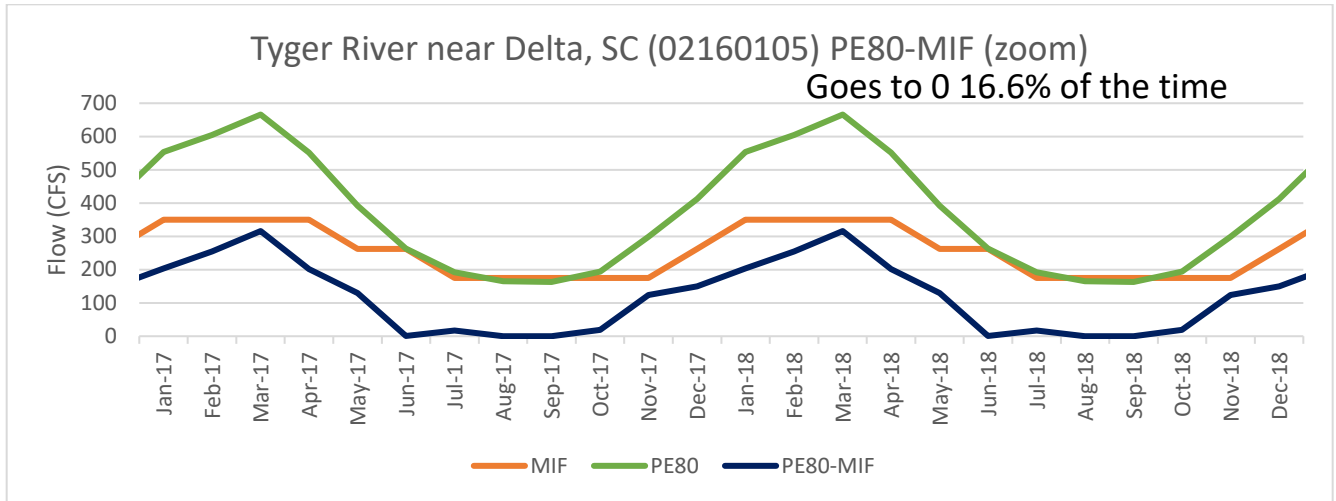
10th Percentile (PE90) – MIF



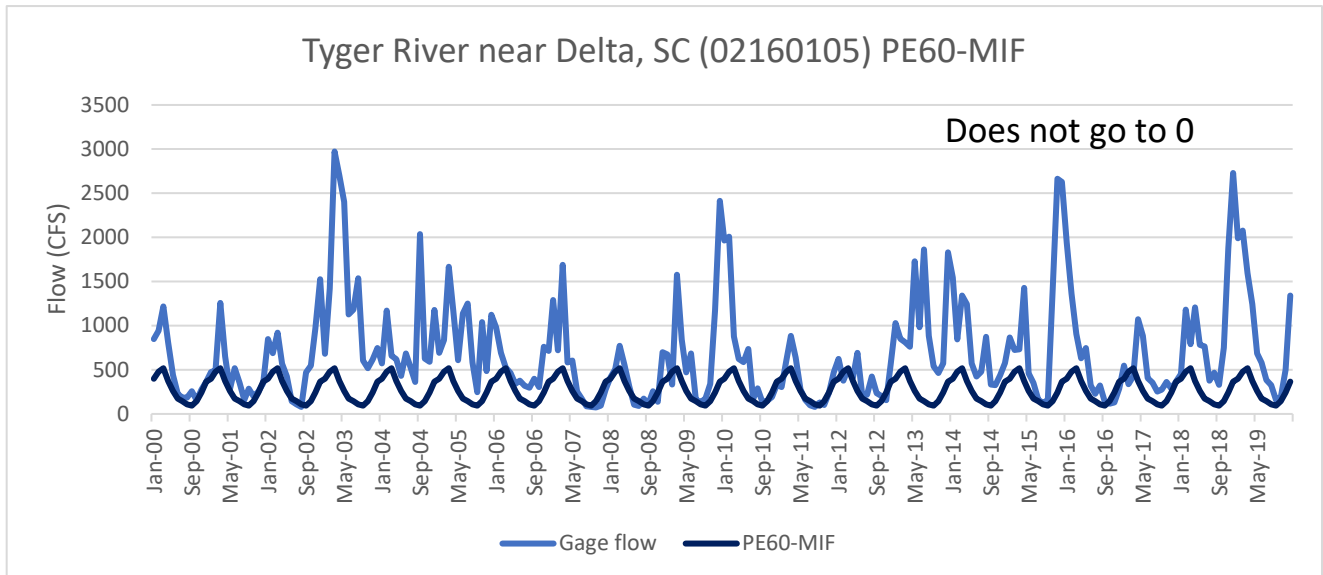


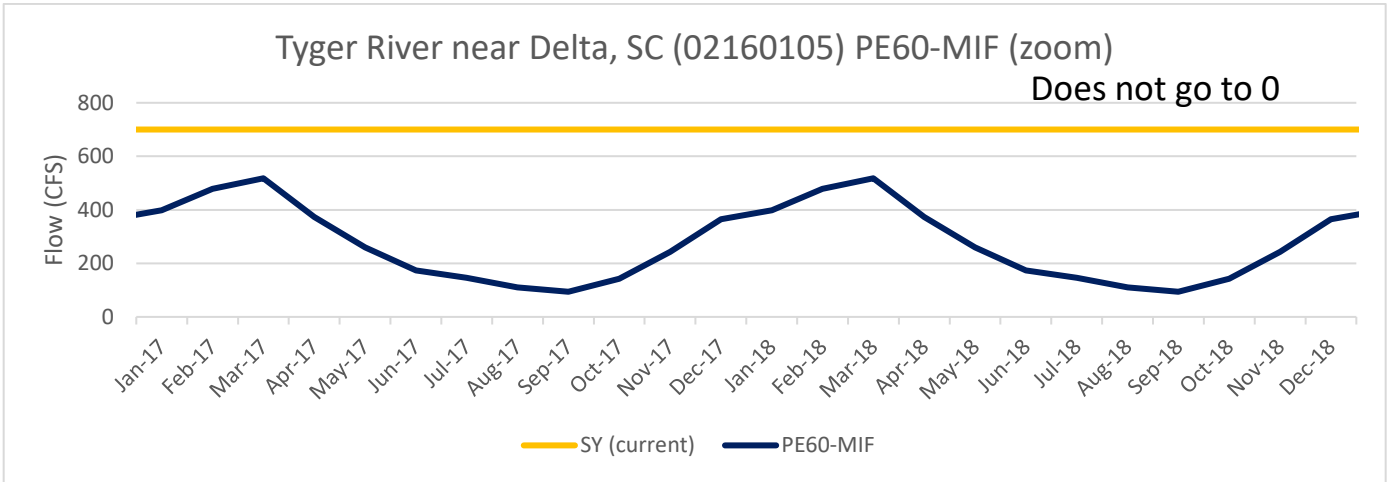
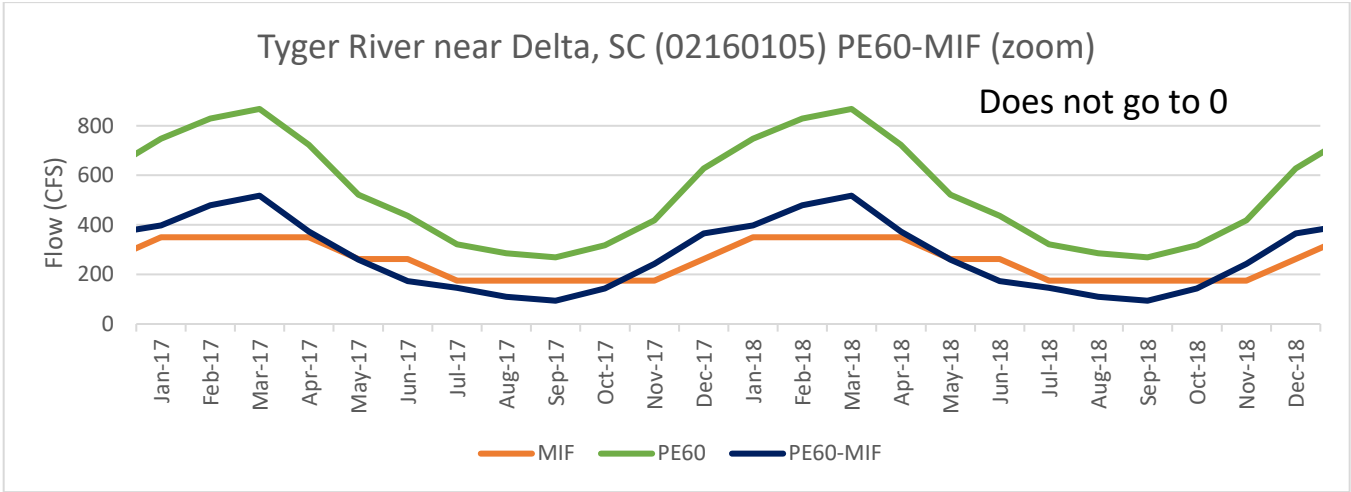
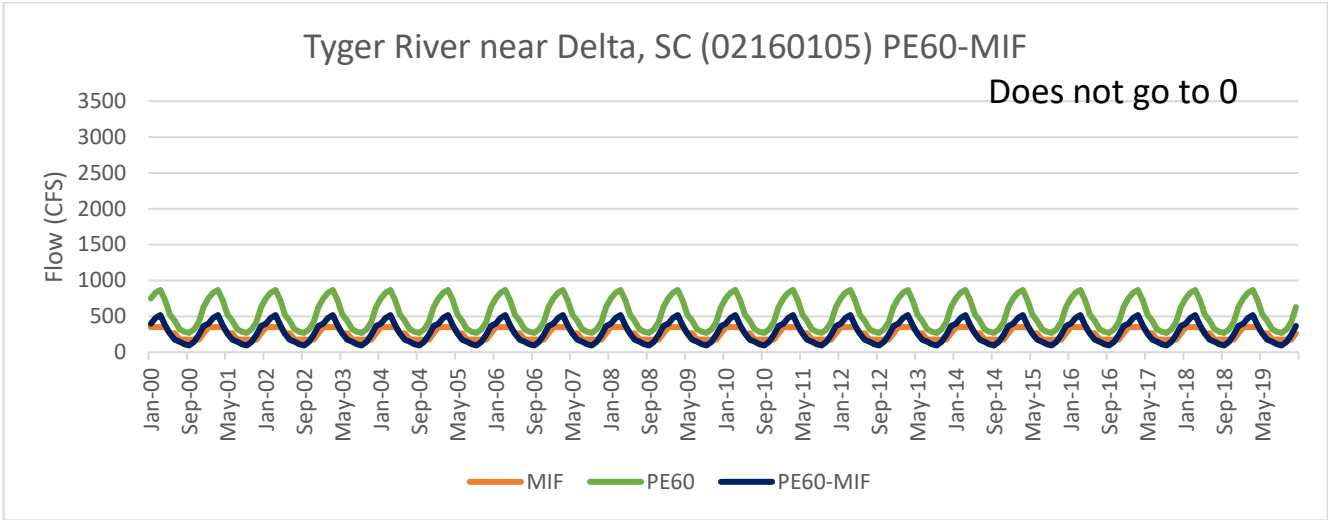
20th Percentile (PE80) – MIF



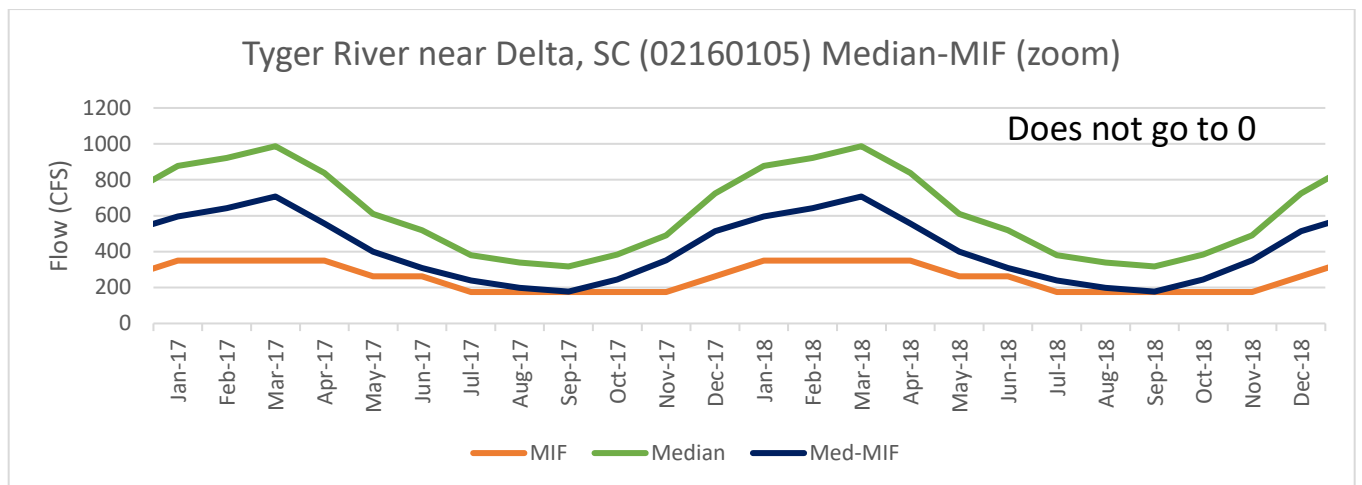
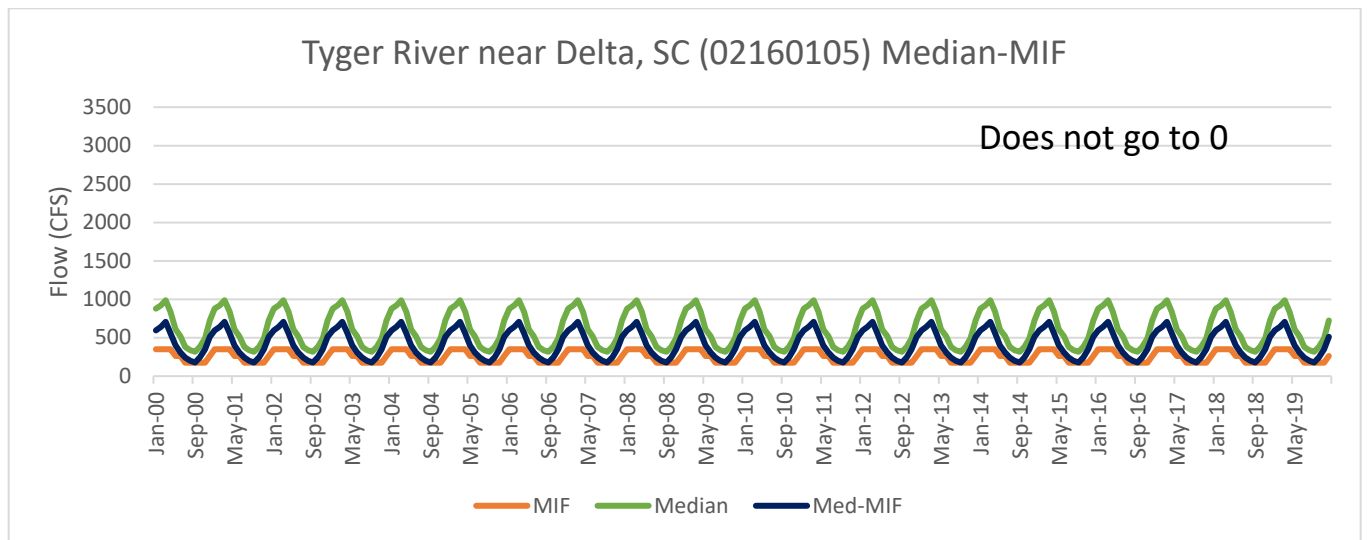
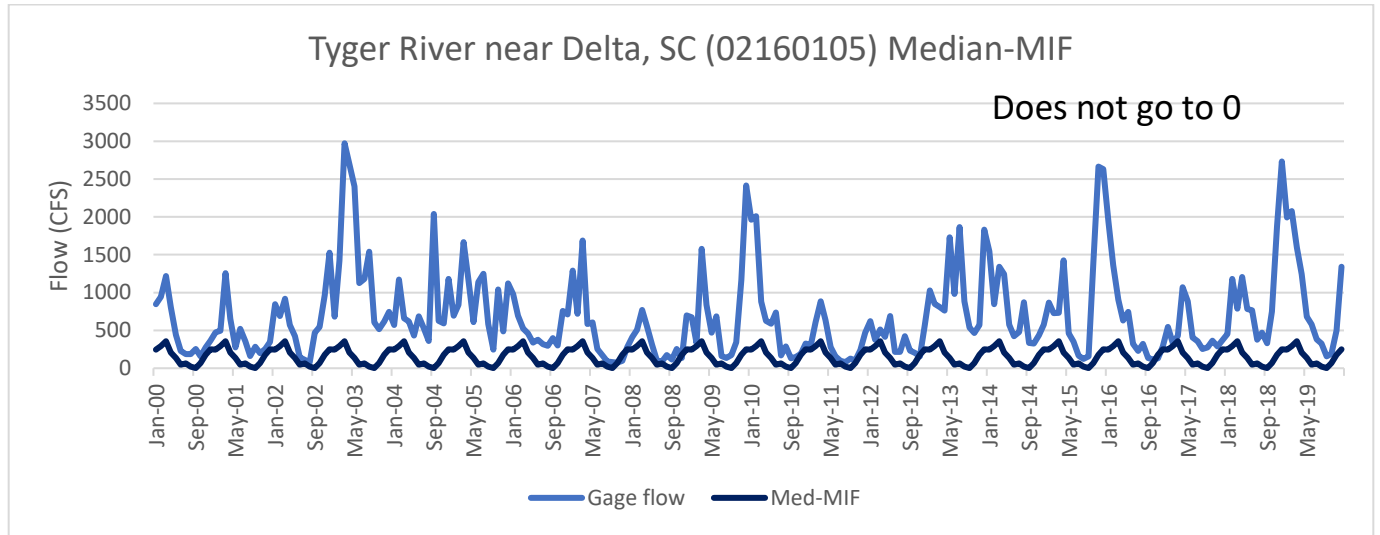


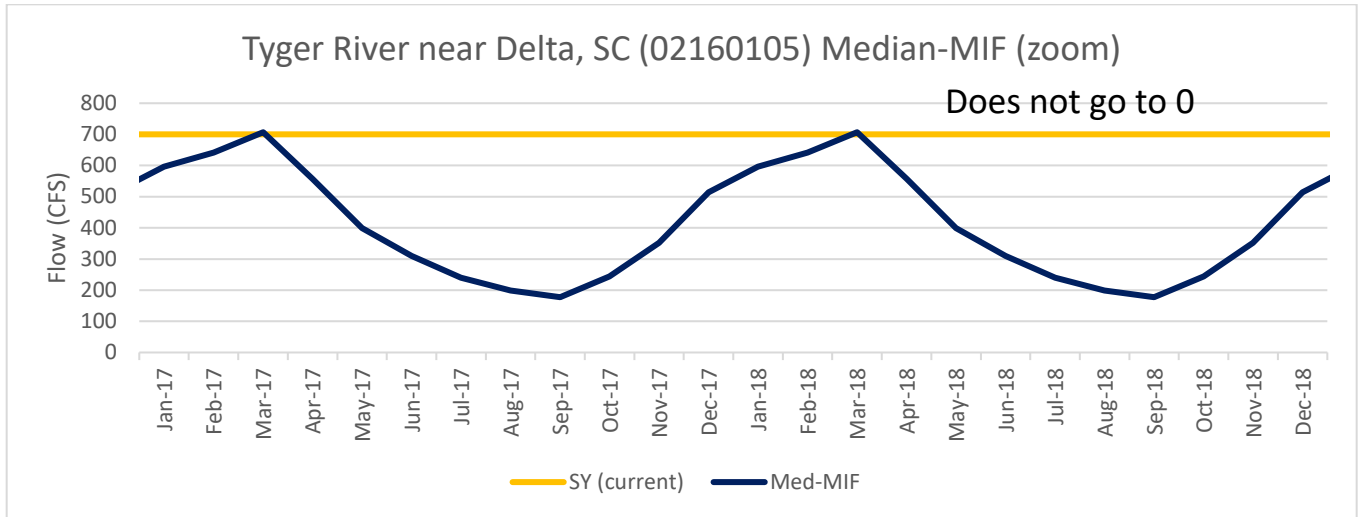
40th Percentile (PE60) – MIF



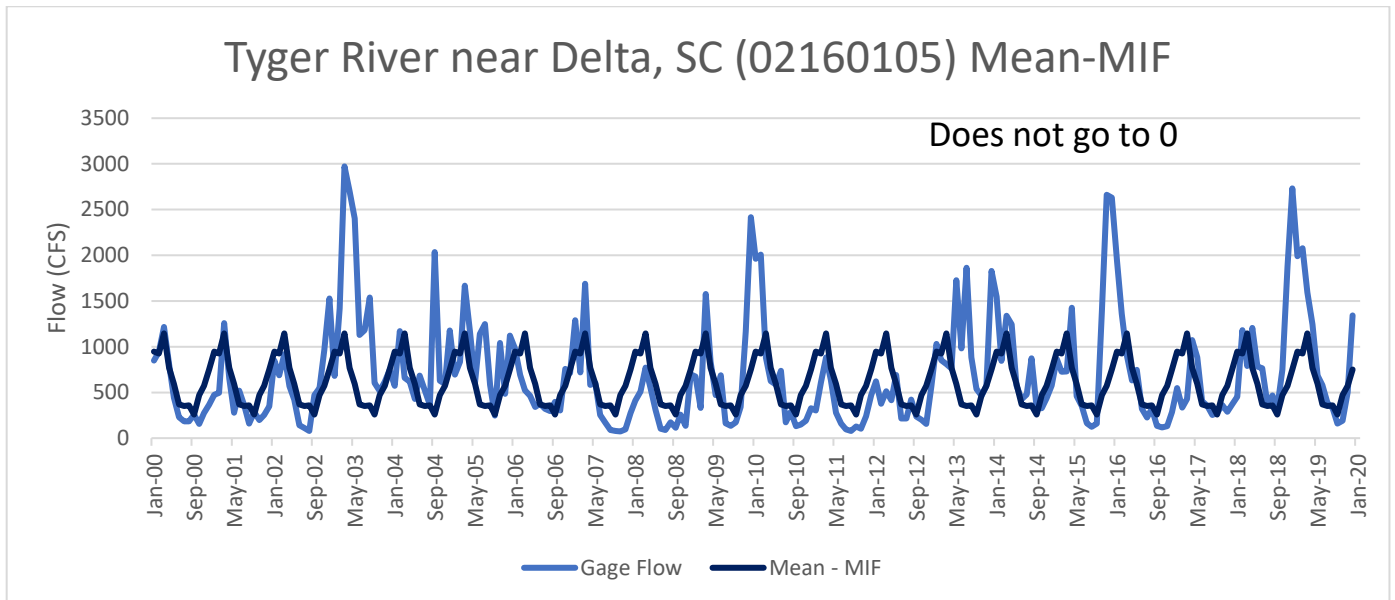


Monthly Median – MIF

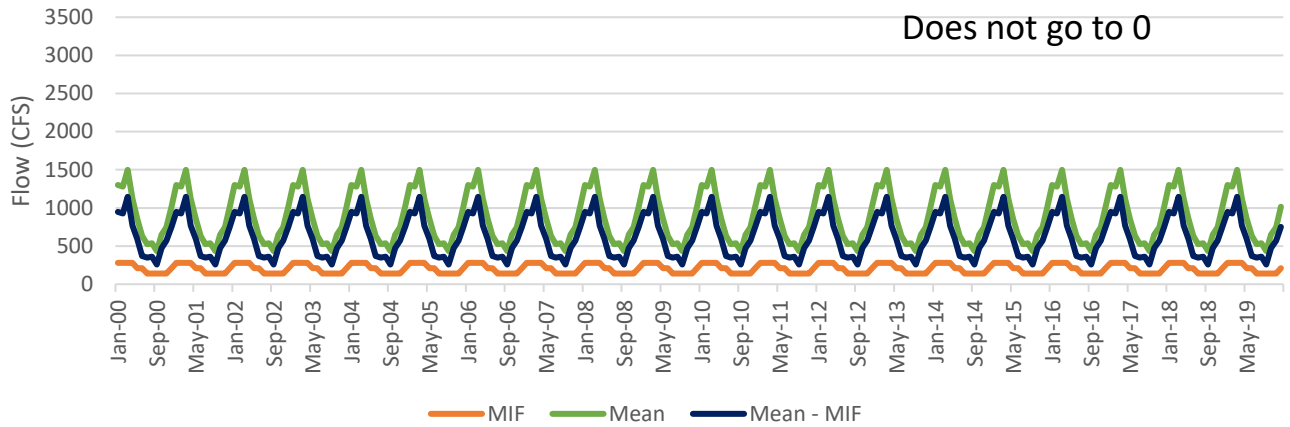




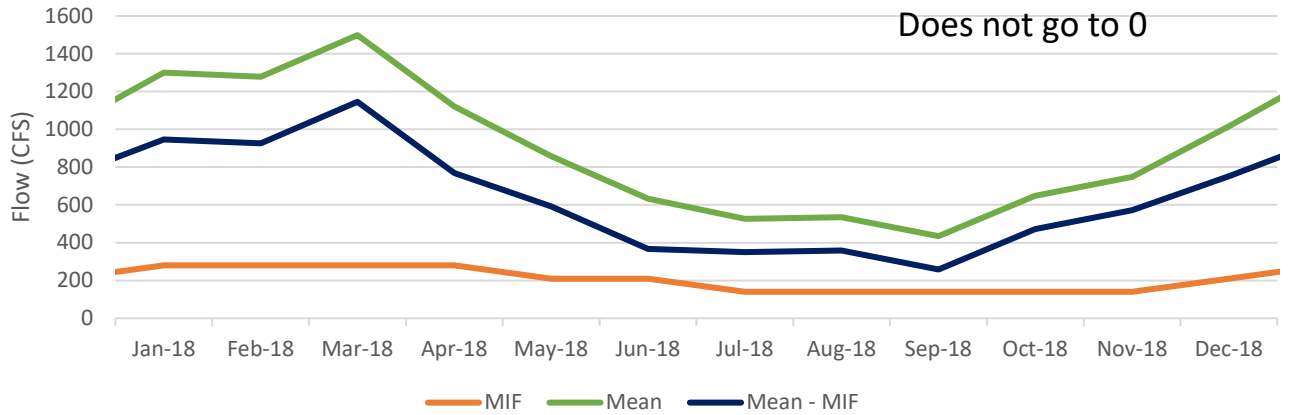
Monthly Mean – MIF



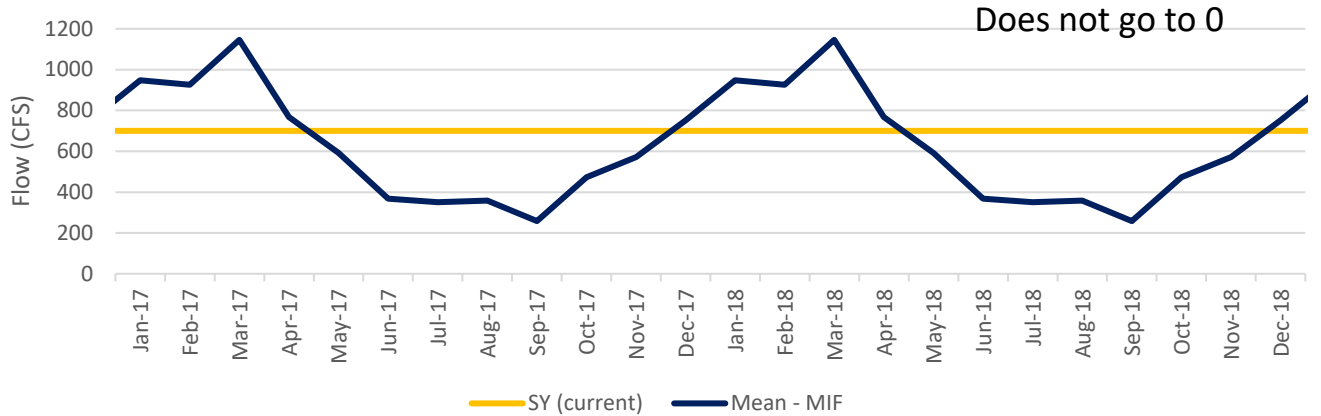
Tyger River near Delta, SC (02160105) Mean-MIF



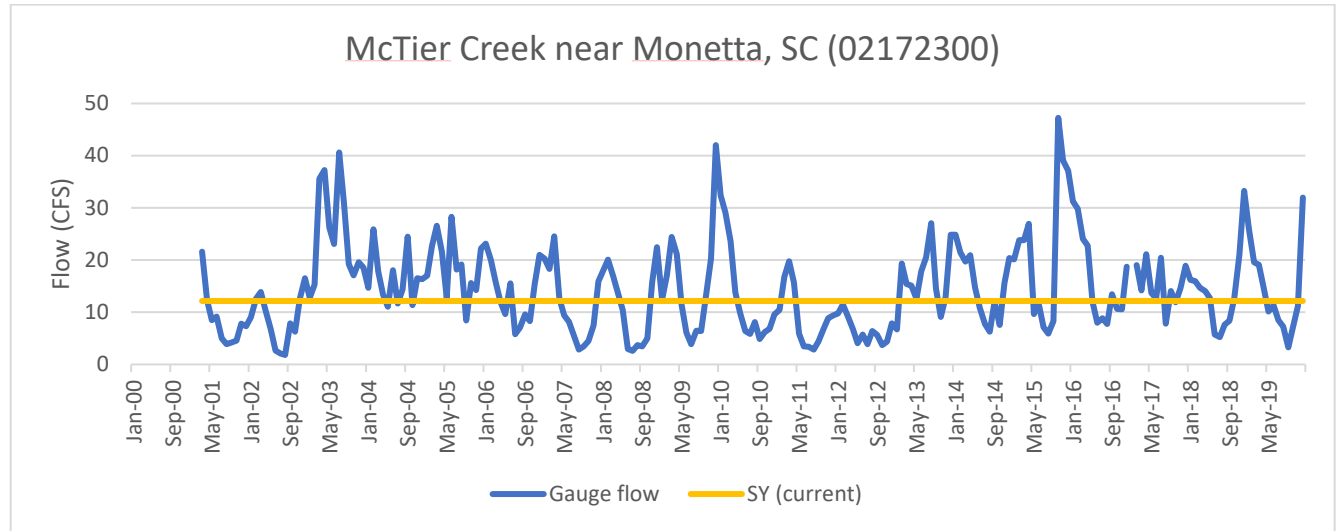
Tyger River near Delta, SC (02160105) Mean-MIF (zoom)



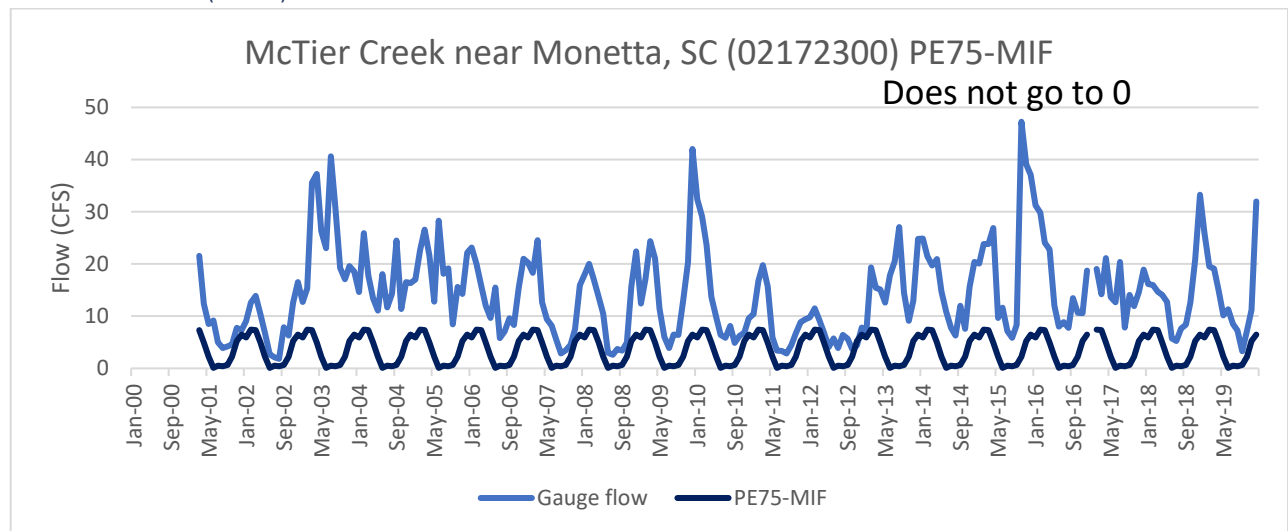
Tyger River near Delta, SC (02160105) Mean-MIF (zoom)

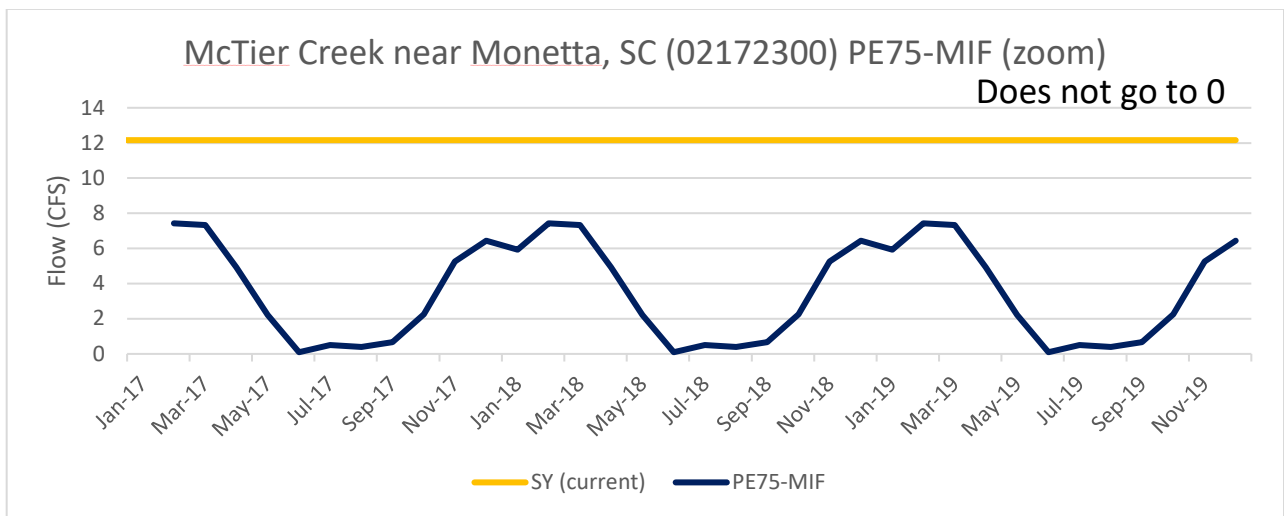
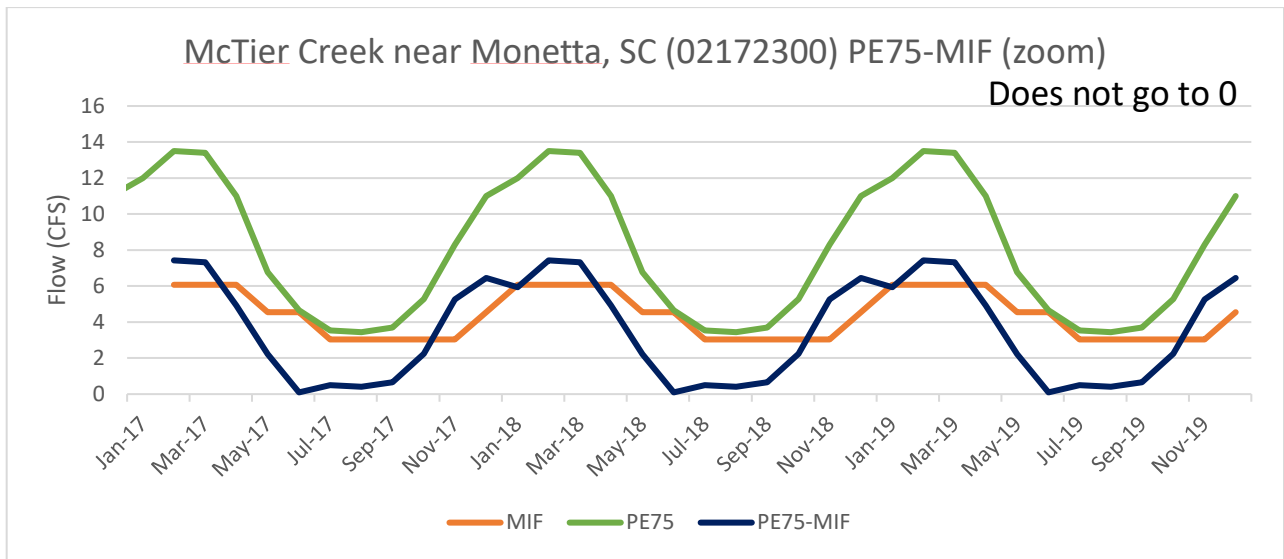
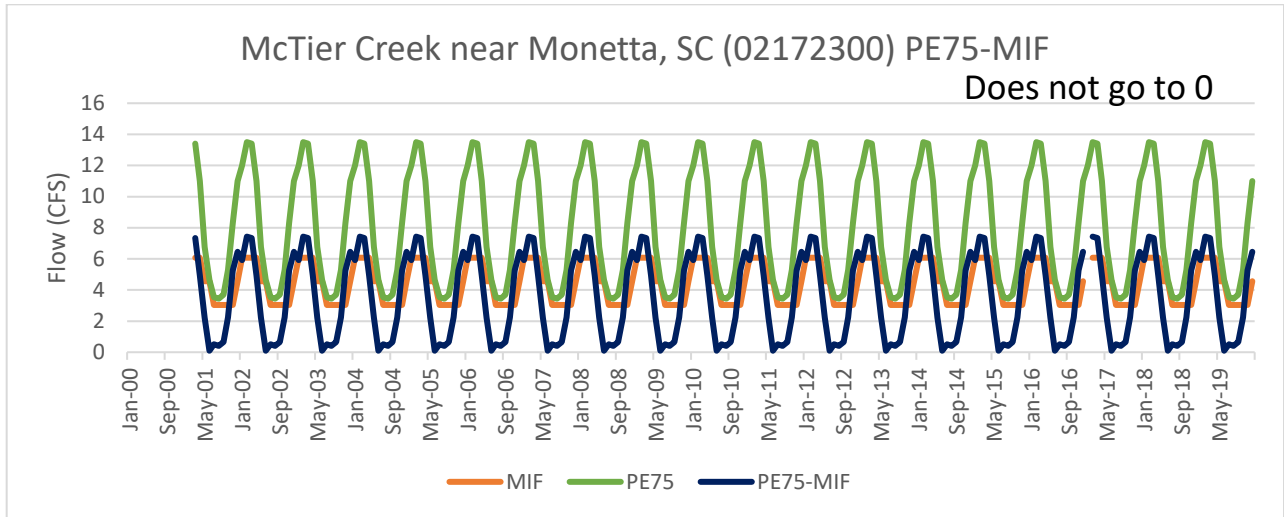


McTier Creek near Monetta, SC (02172300)

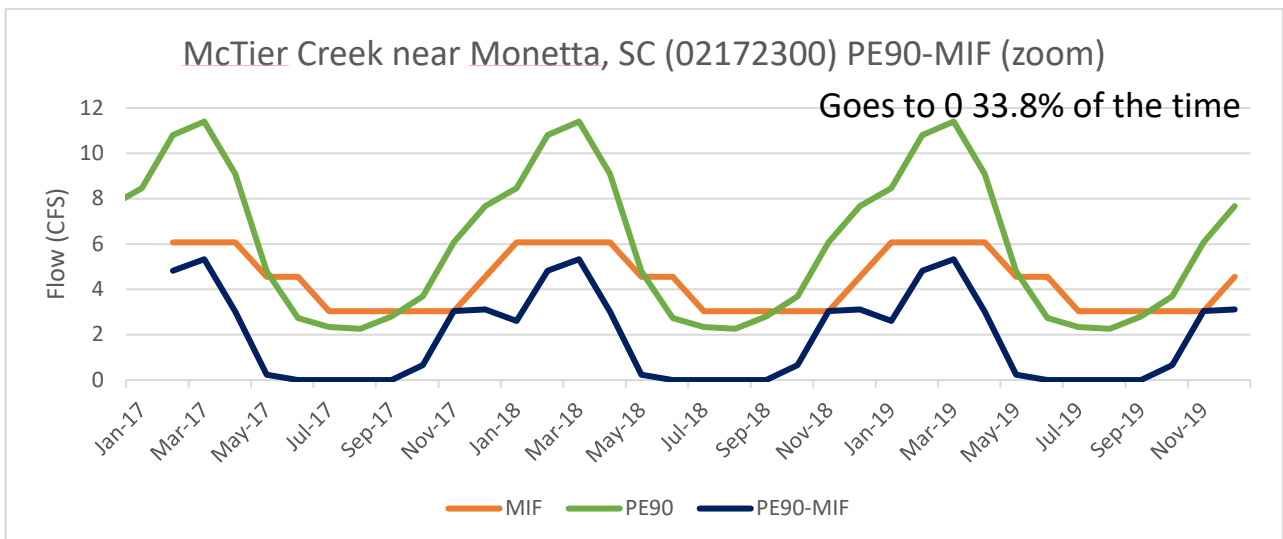
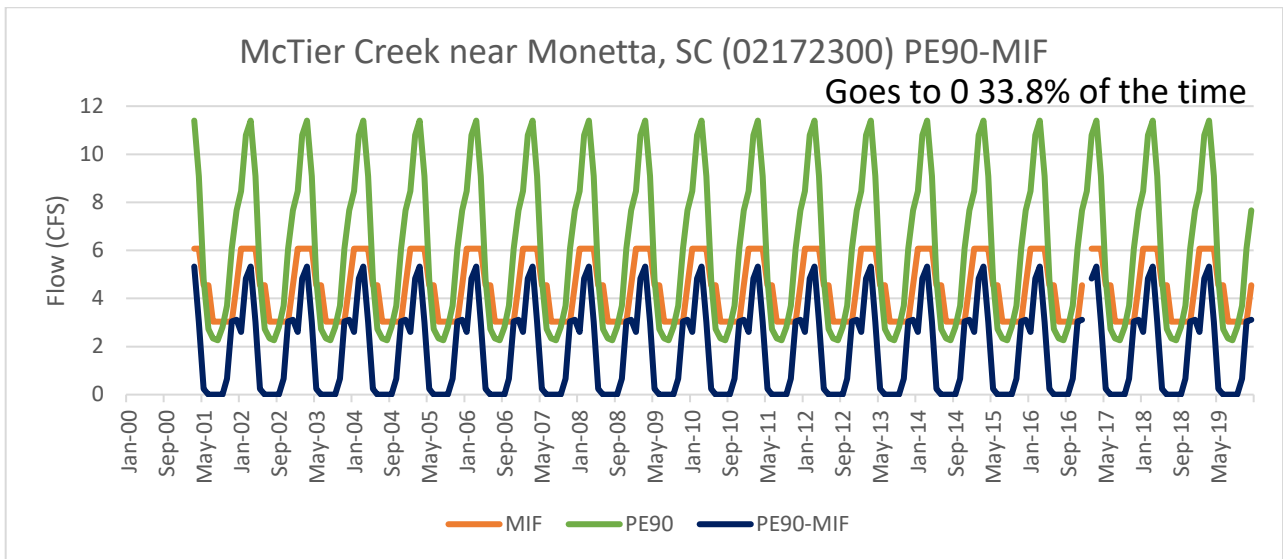
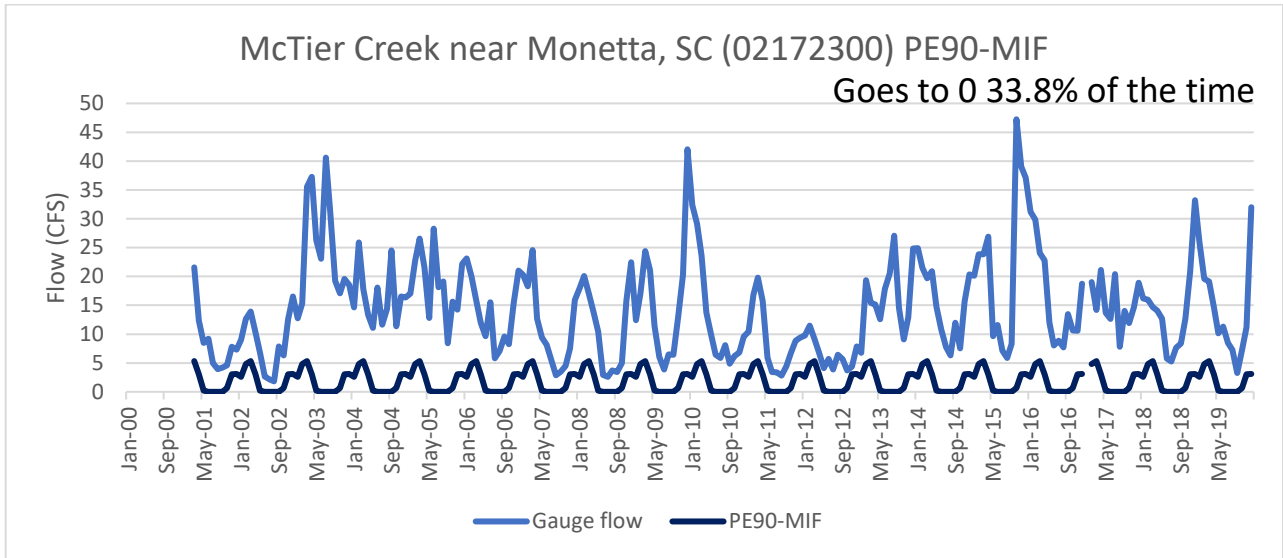


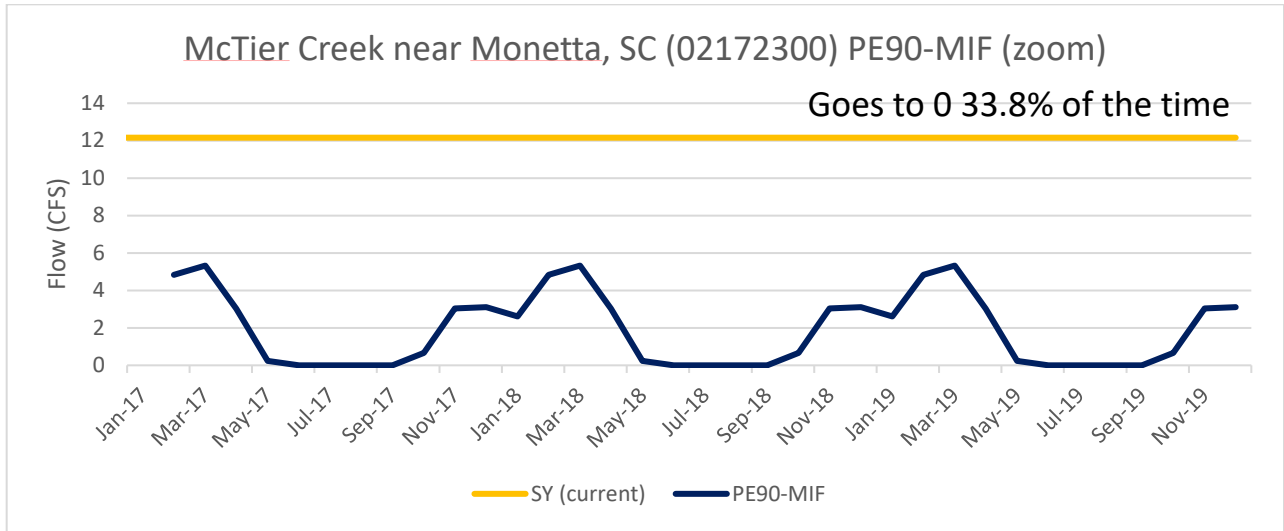
25th Percentile (PE75) – MIF



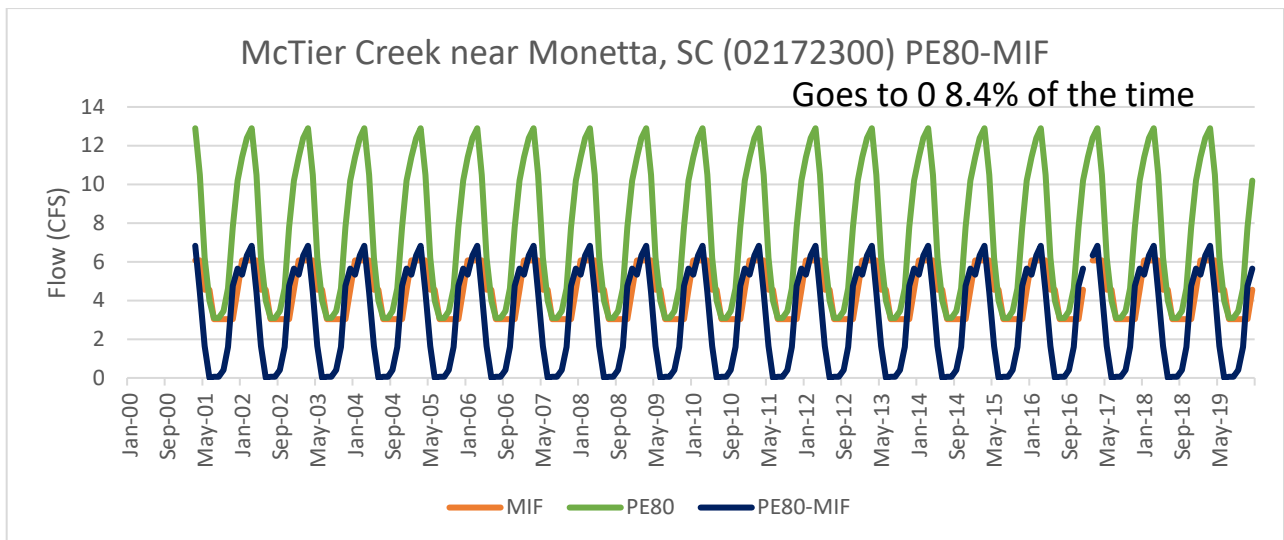
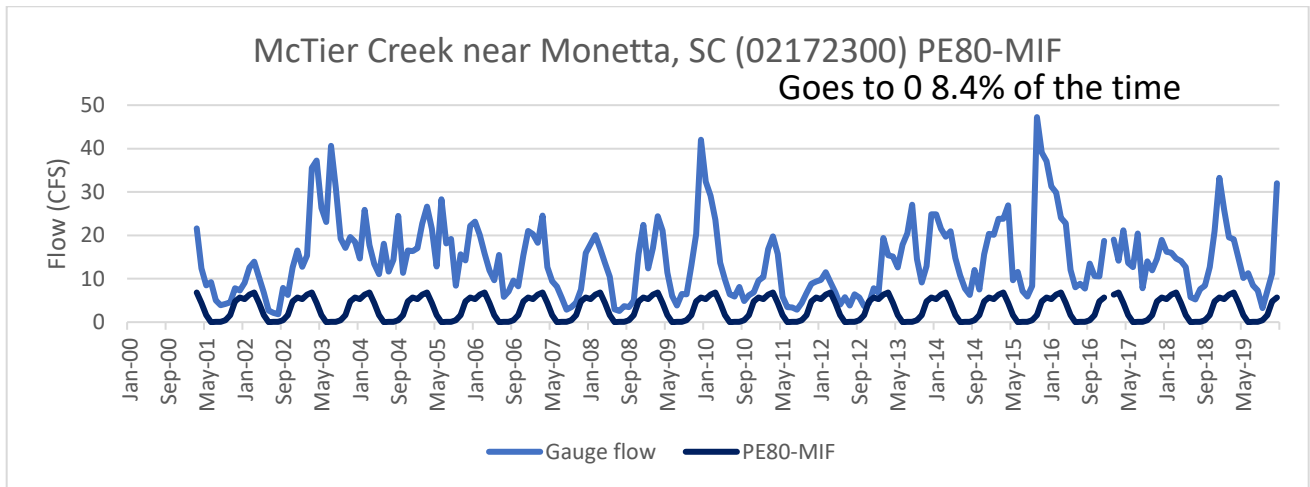


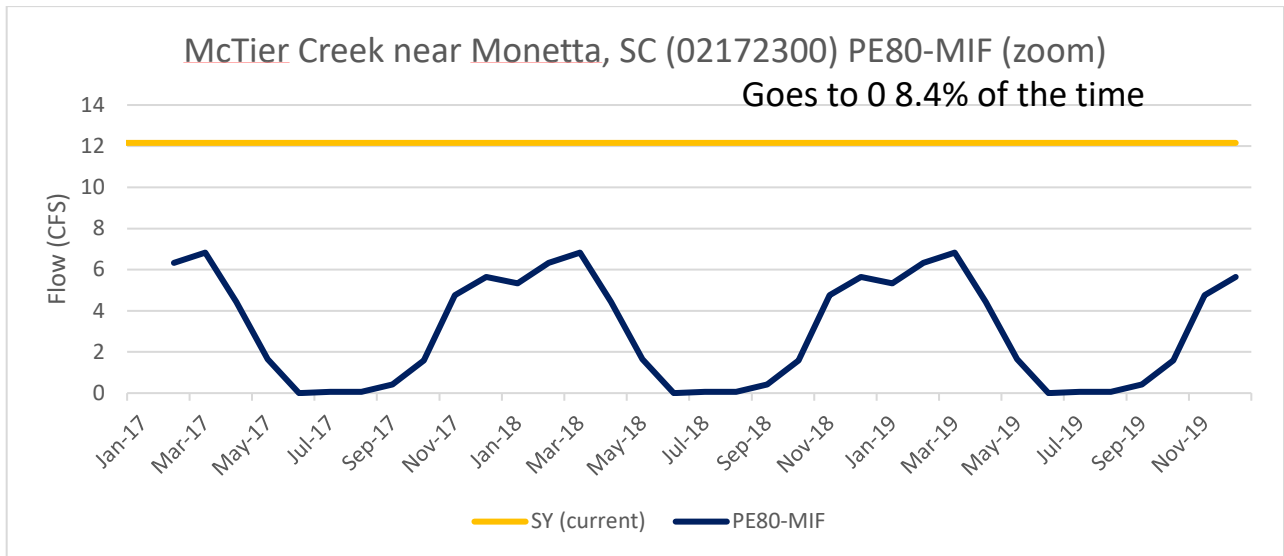
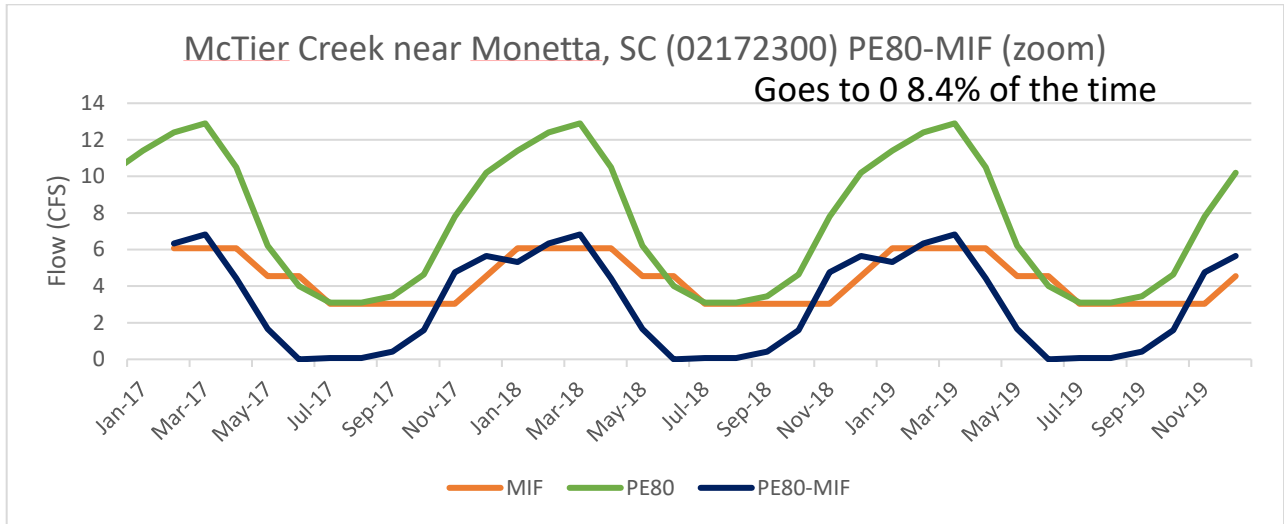
10th Percentile (PE90) – MIF



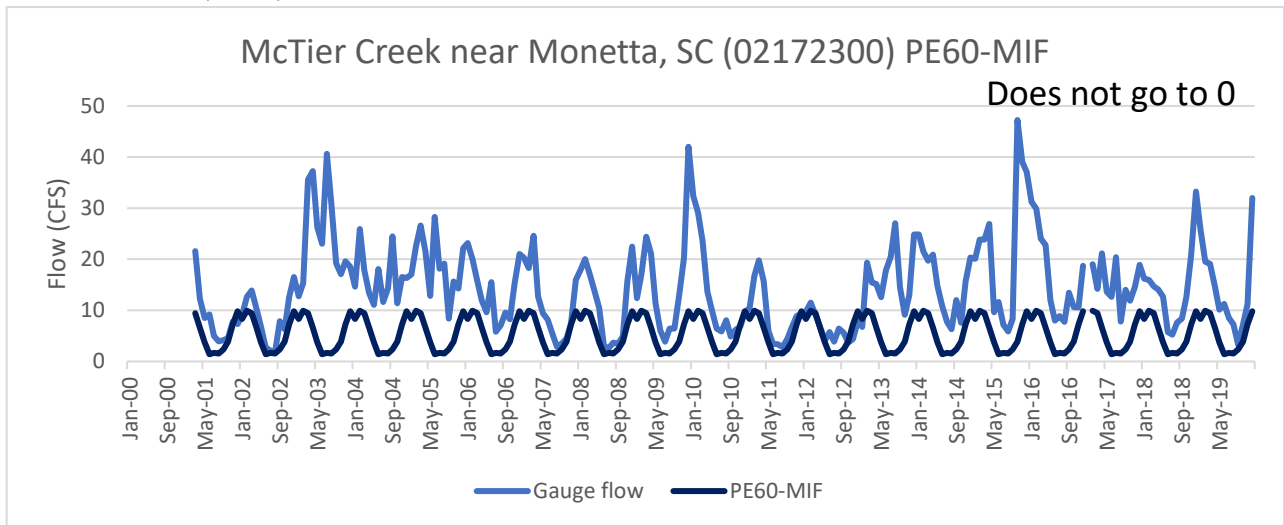


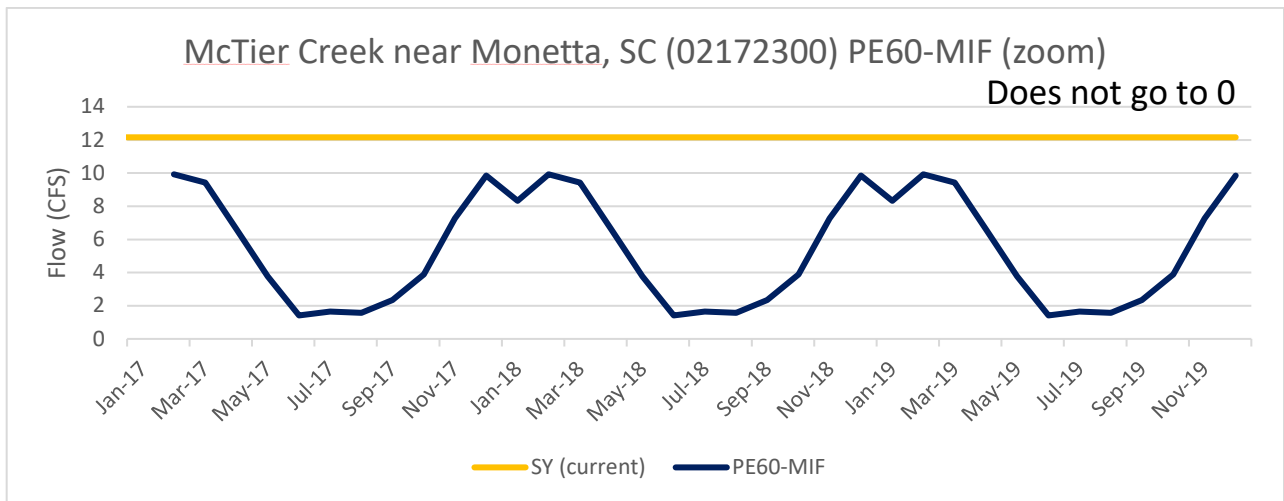
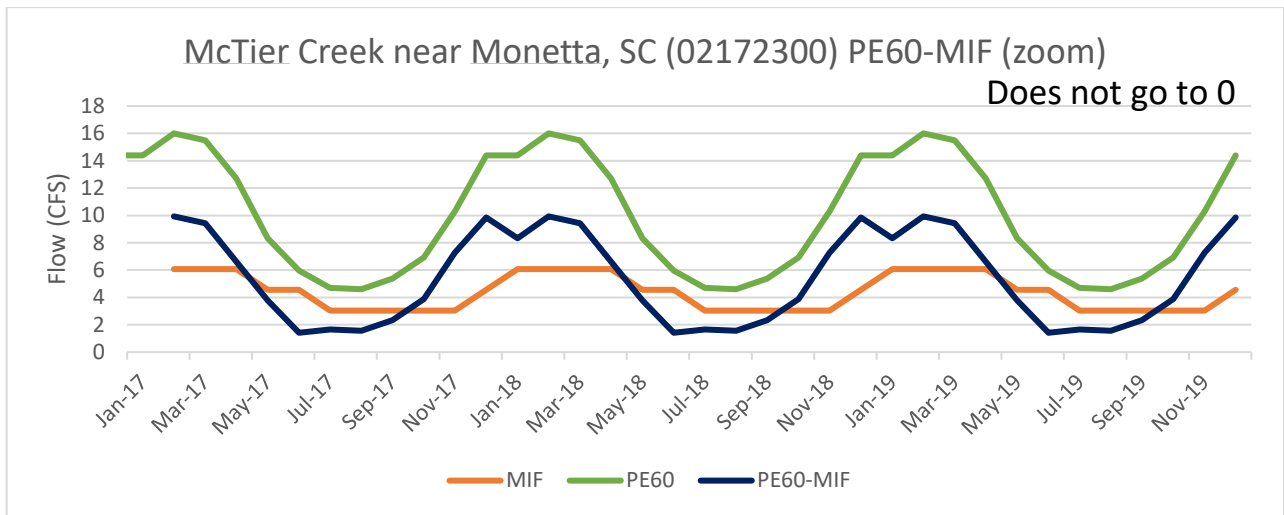
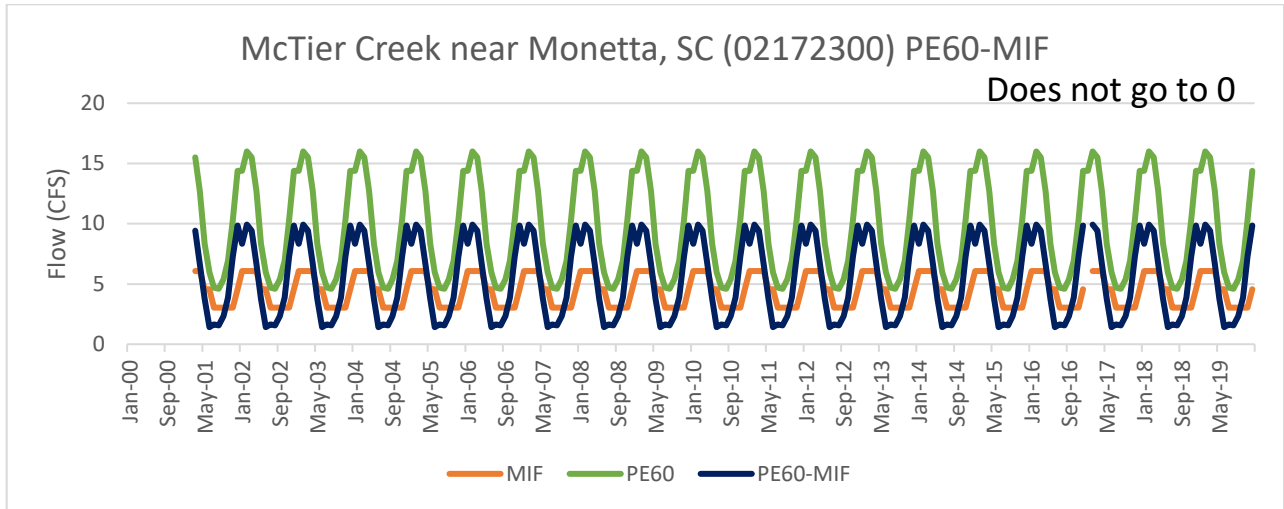
20th Percentile (PE80) -MIF



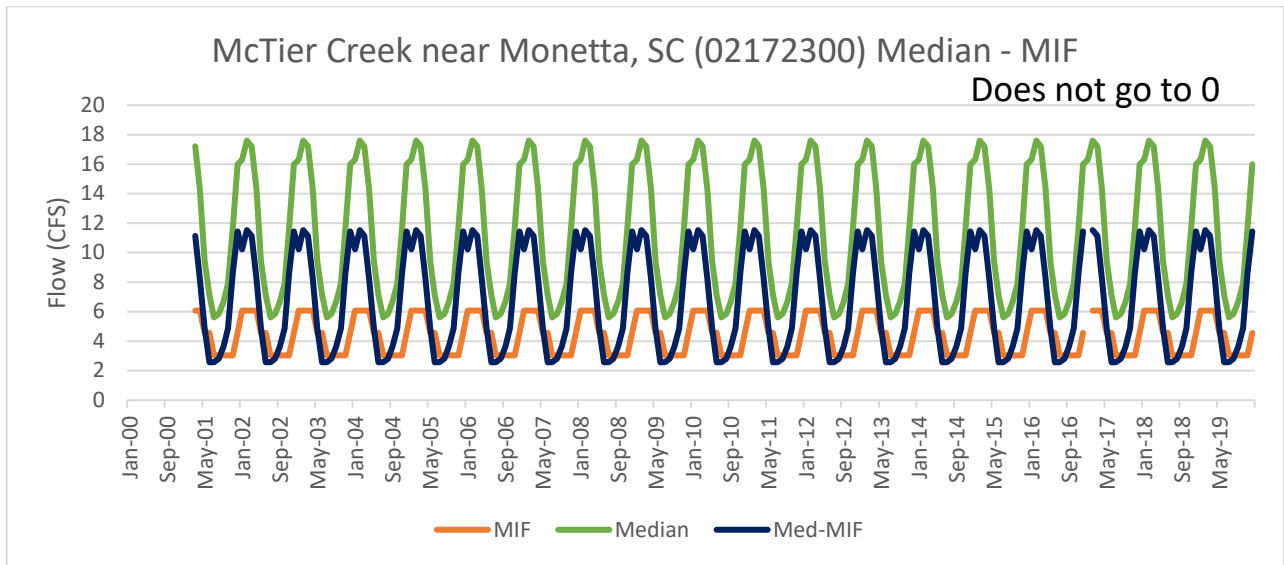
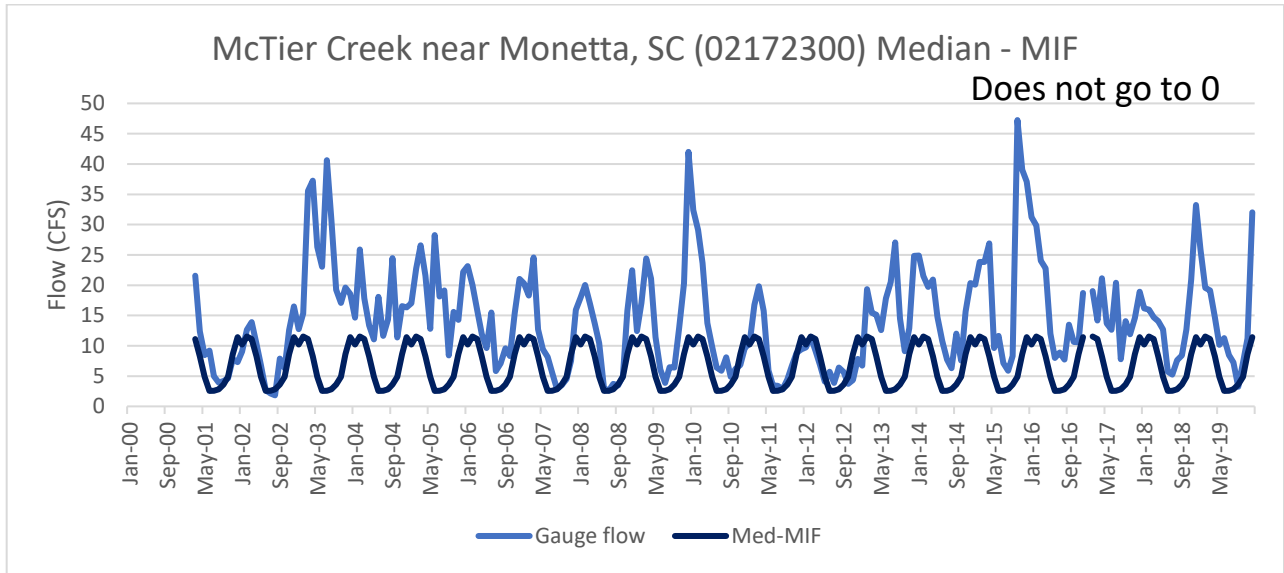


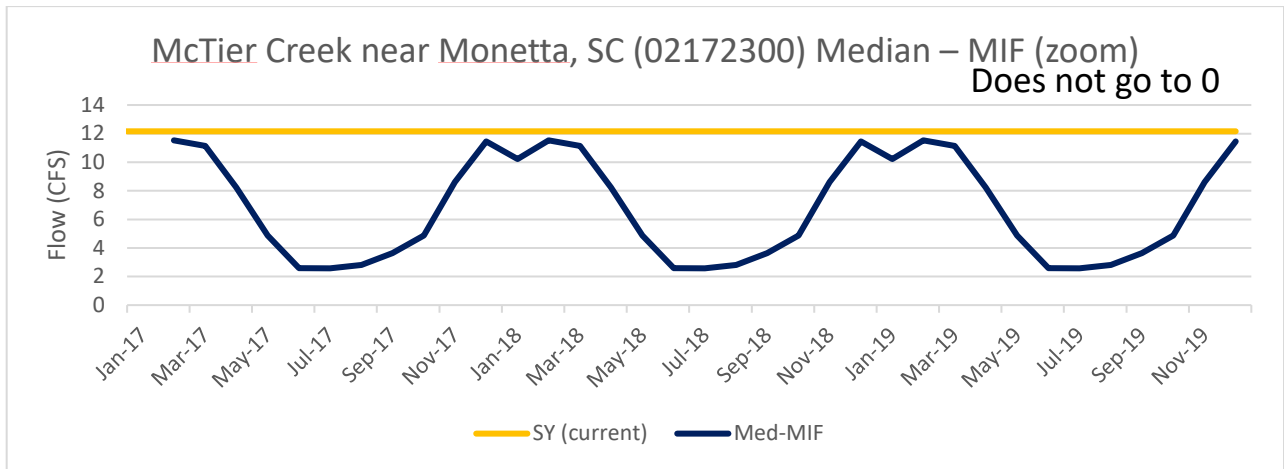
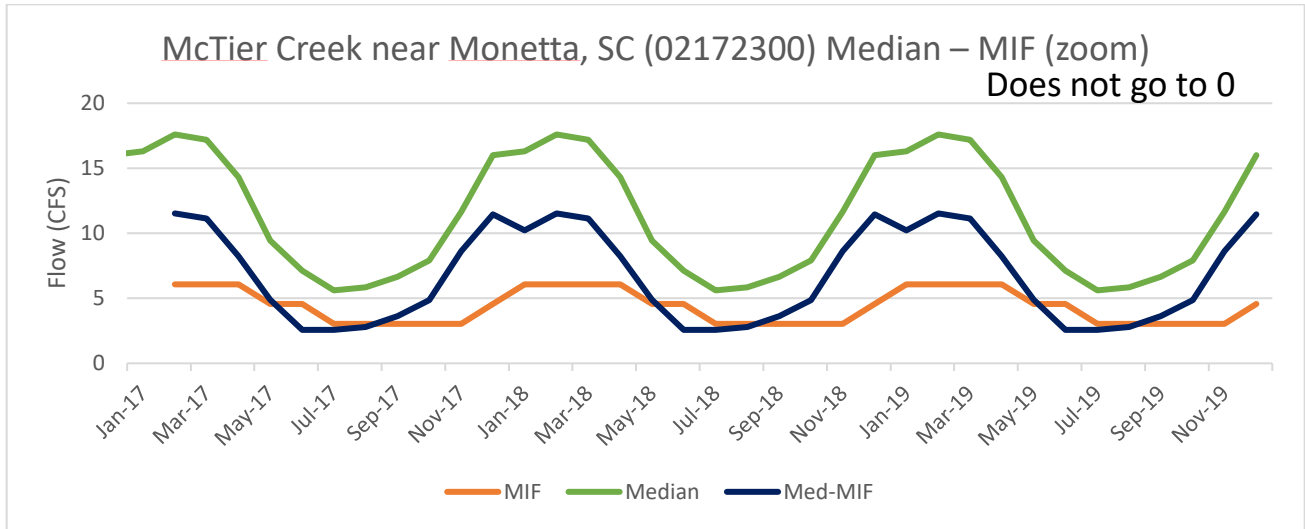
40th Percentile (PE60) -MIF



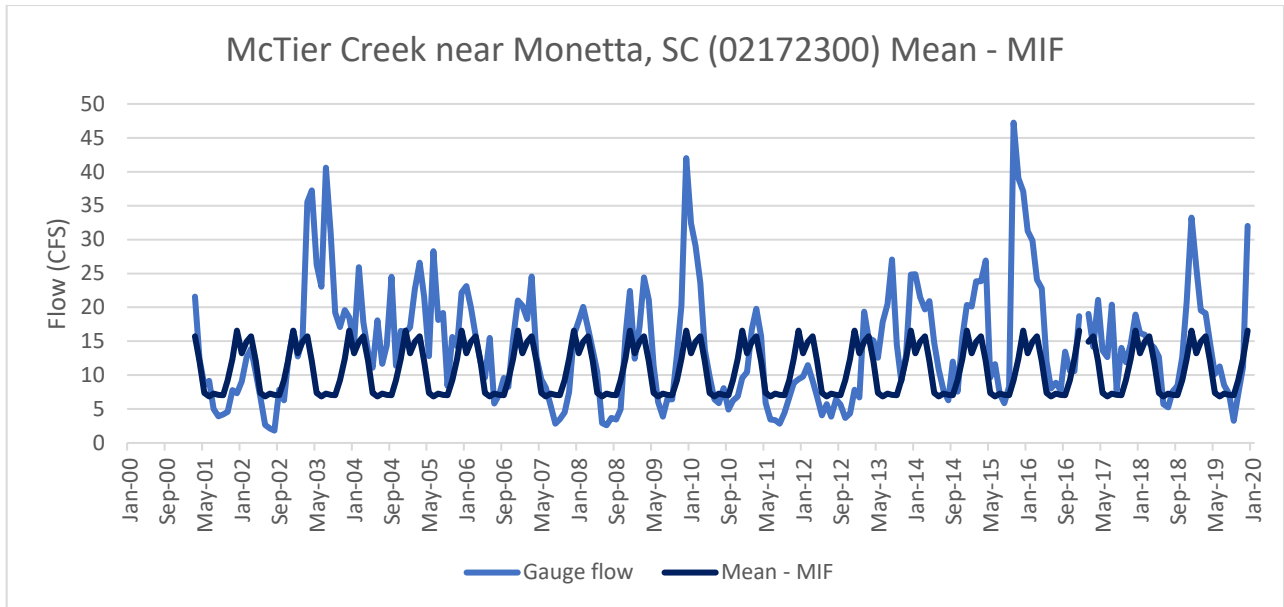


Monthly Median – MIF

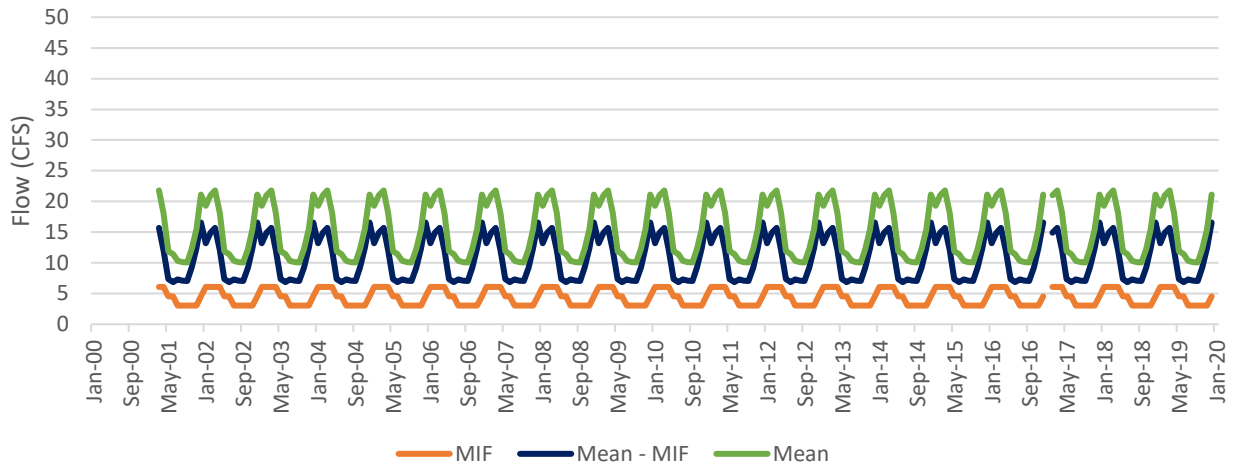




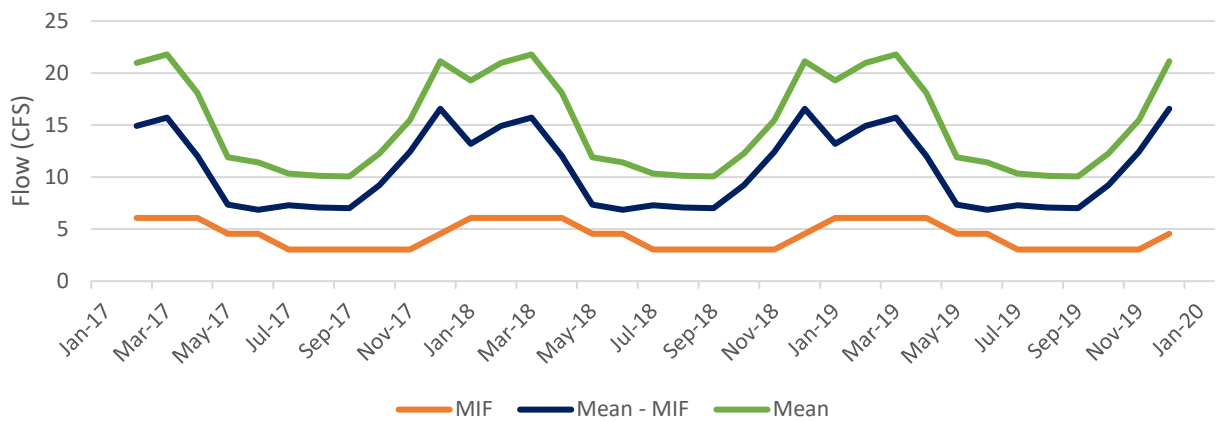
Monthly Mean – MIF



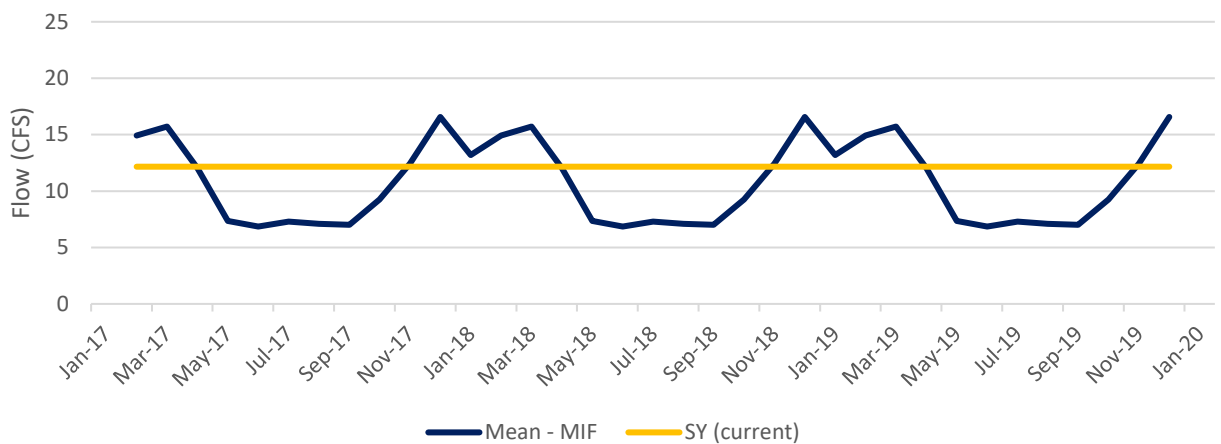
McTier Creek near Monetta, SC (02172300) Mean - MIF



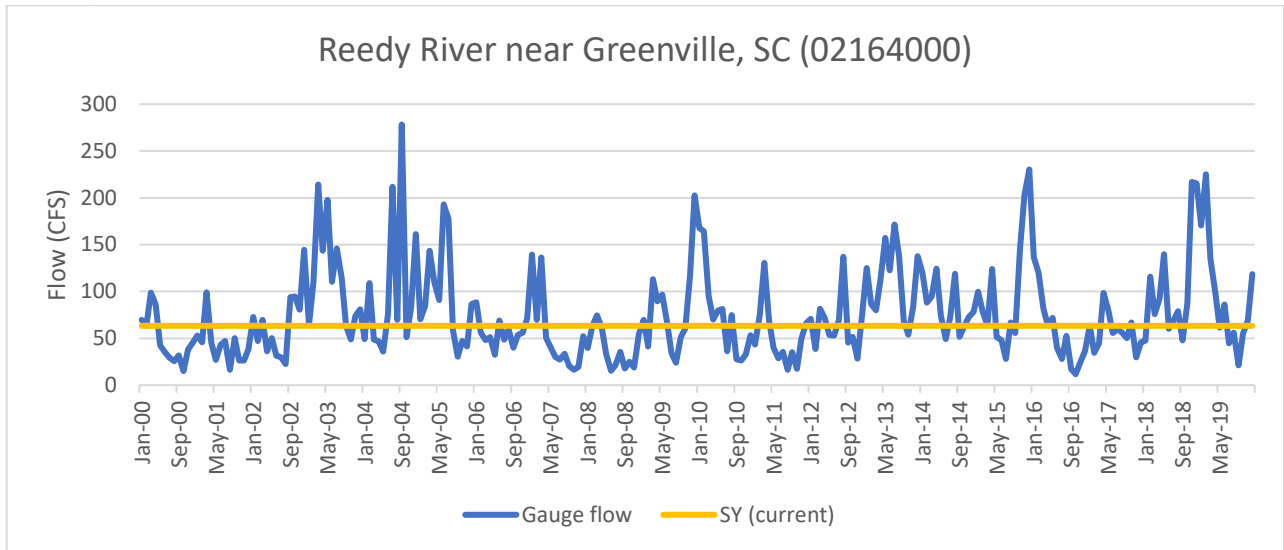
McTier Creek near Monetta, SC (02172300) Mean - MIF (zoom)



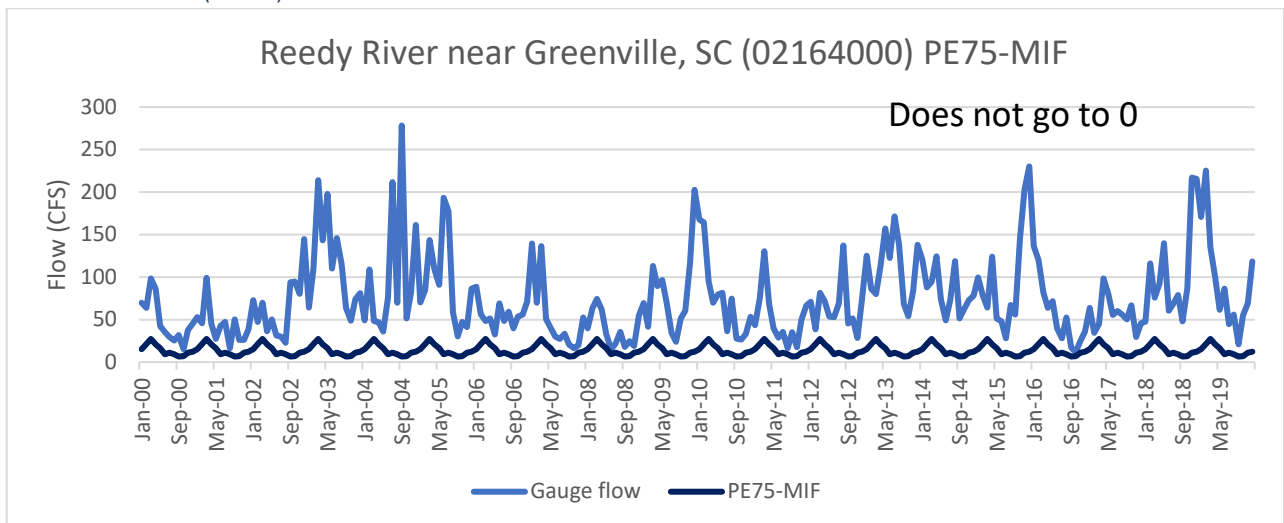
McTier Creek near Monetta, SC (02172300) Mean - MIF (zoom)

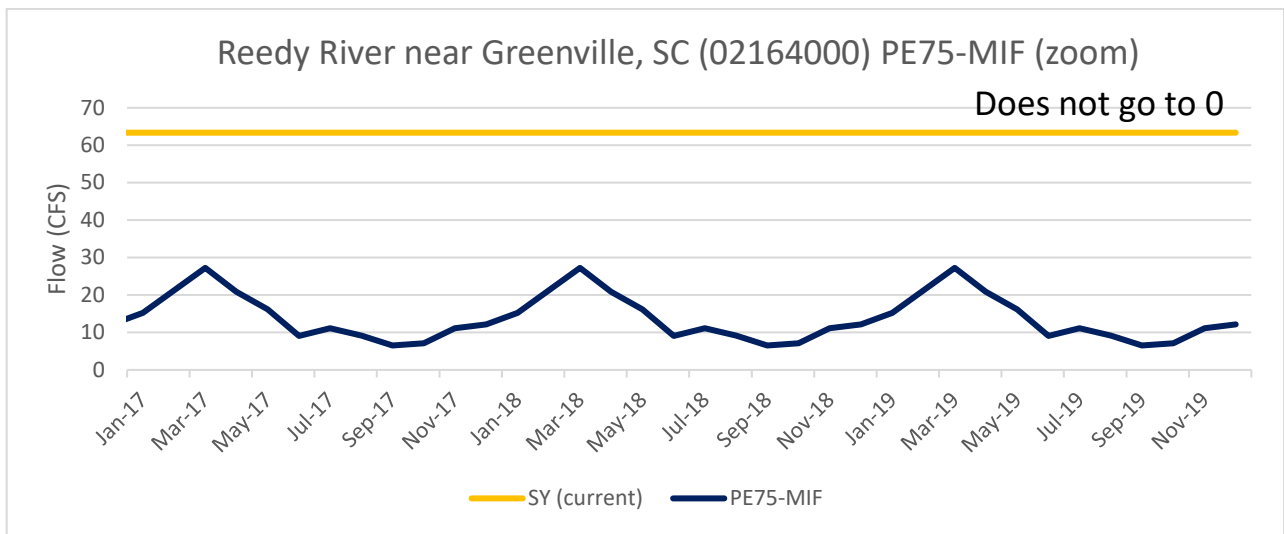
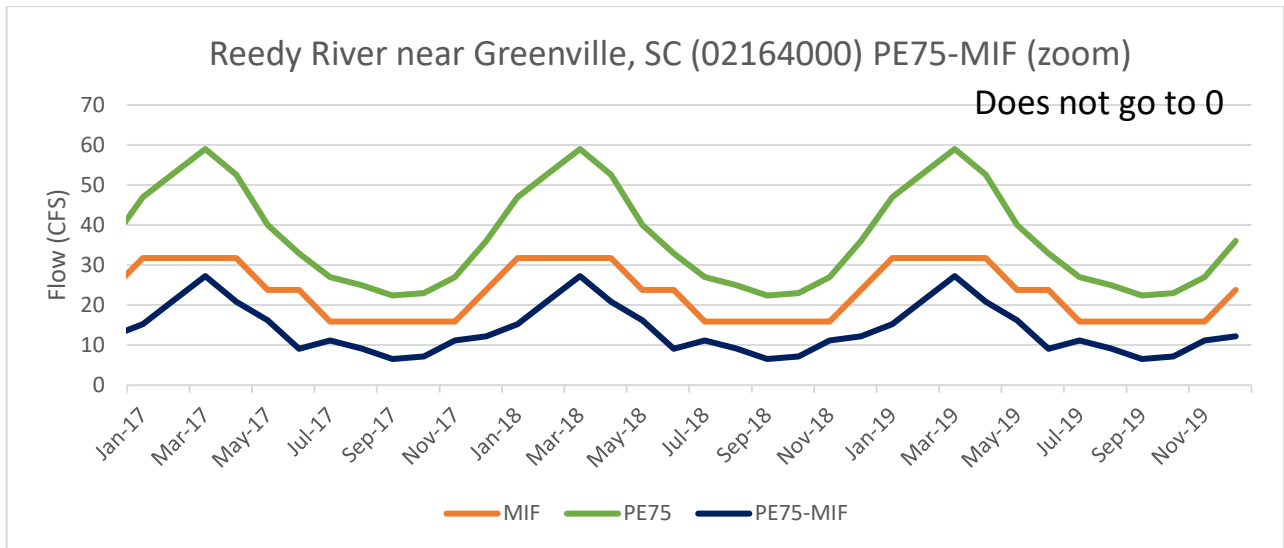
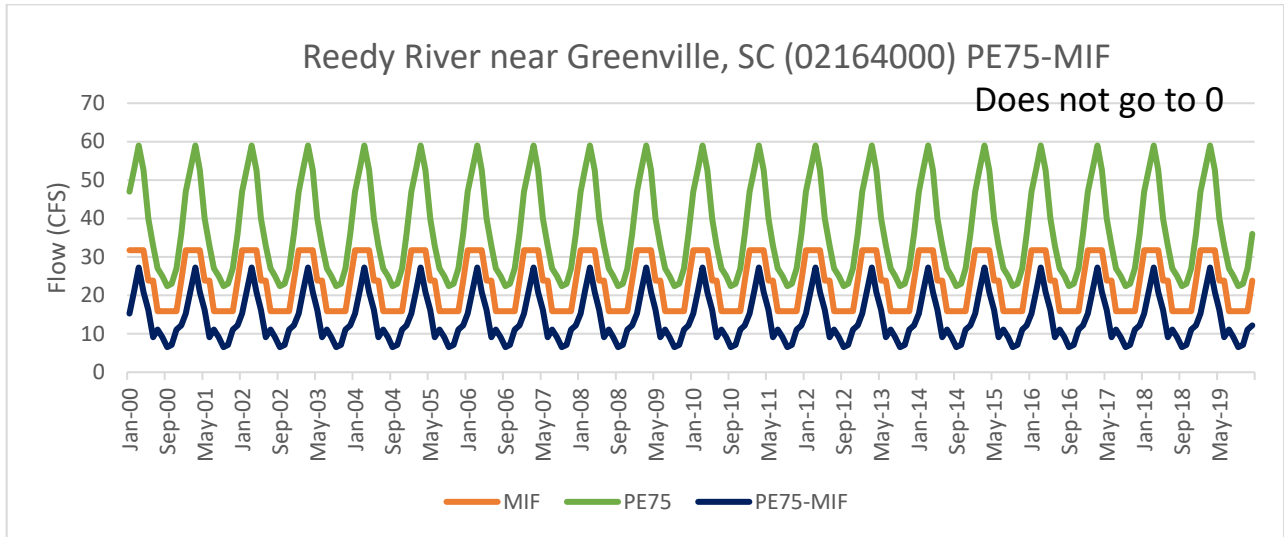


Reedy River near Greenville

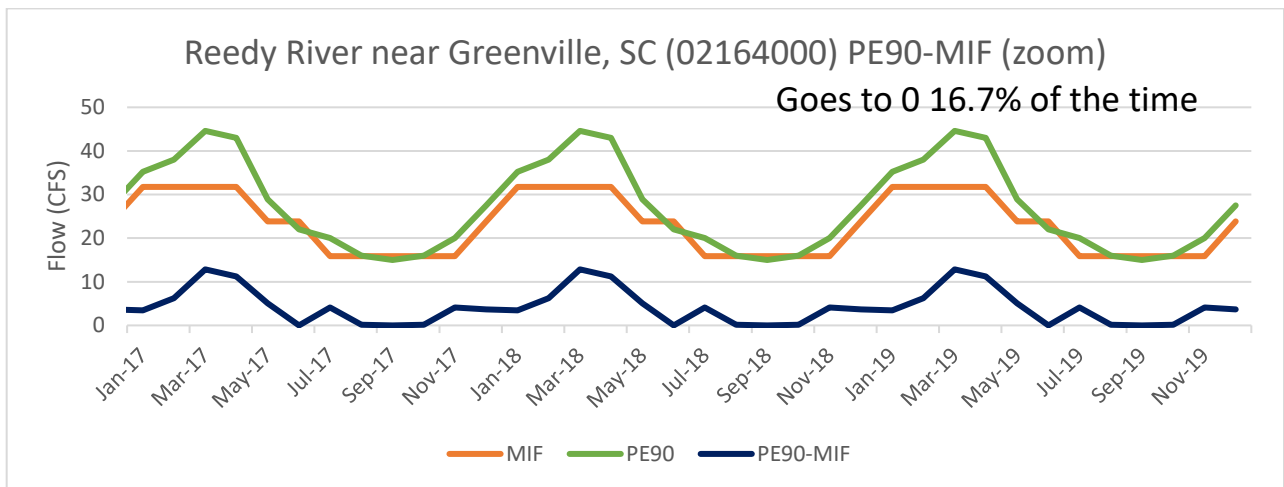
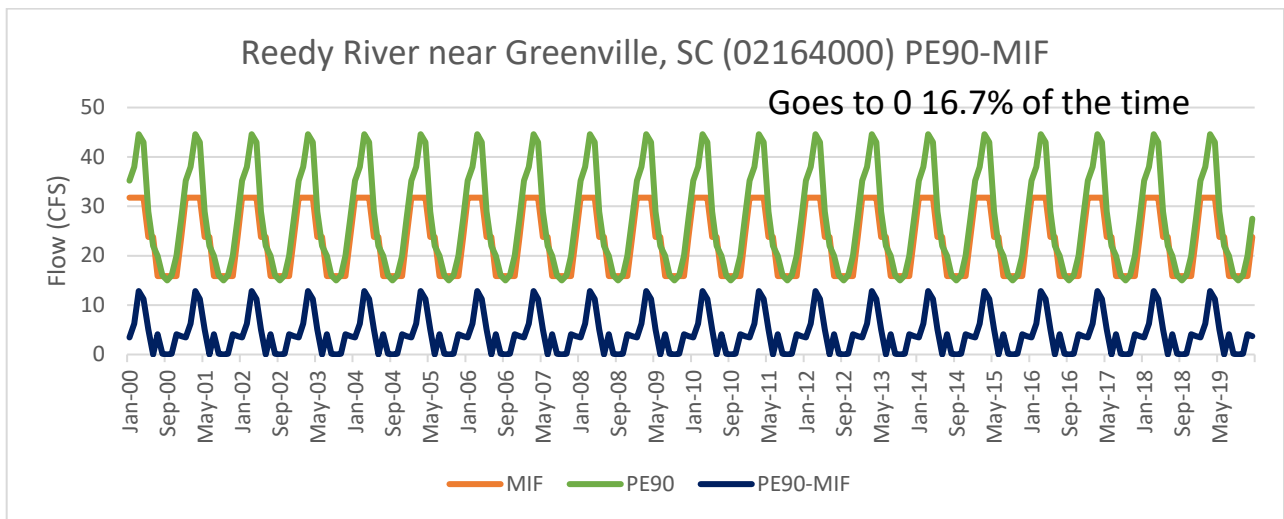
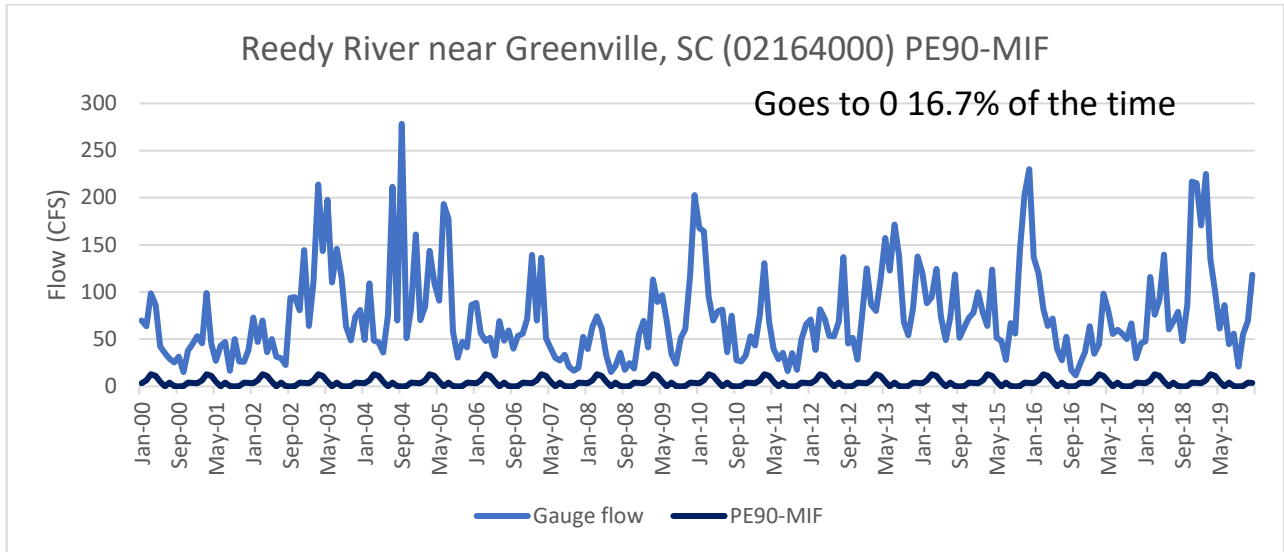


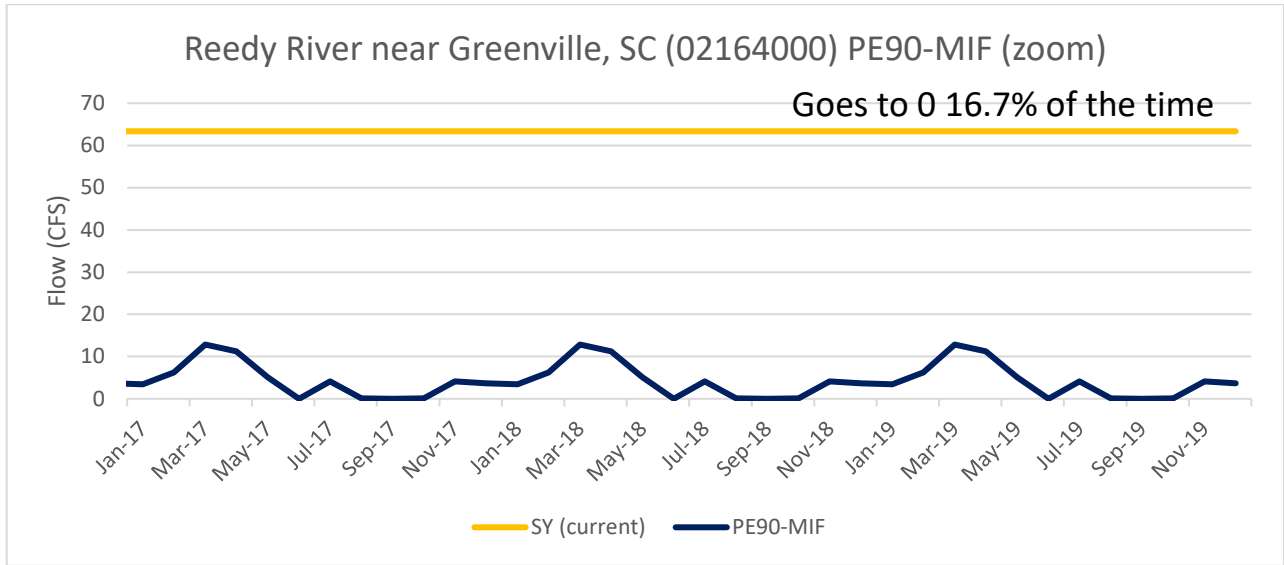
25th Percentile (PE75) – MIF



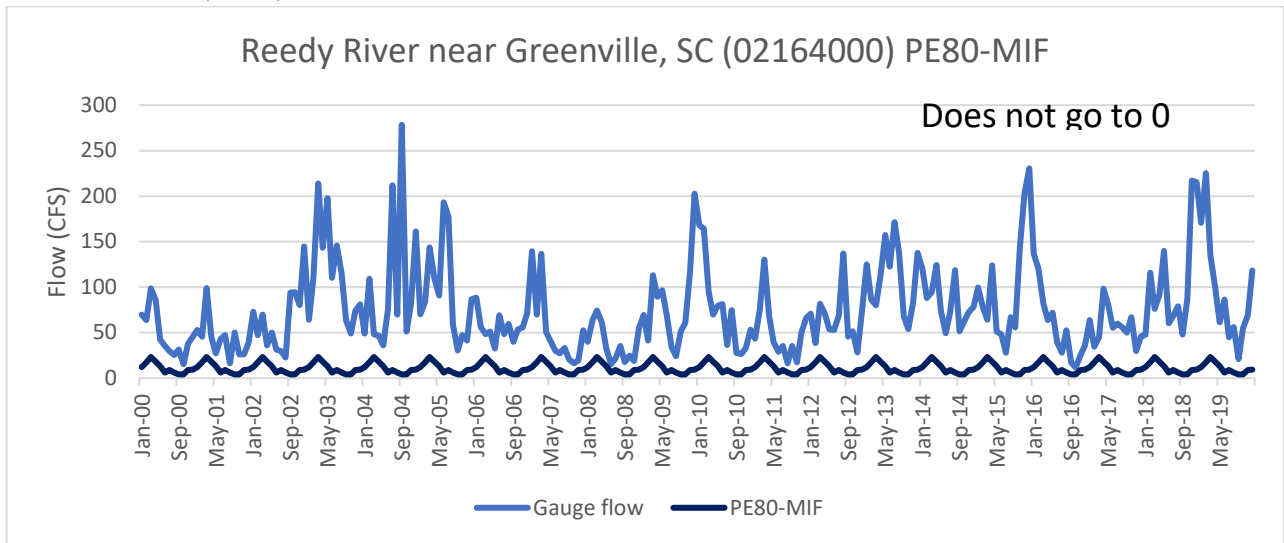


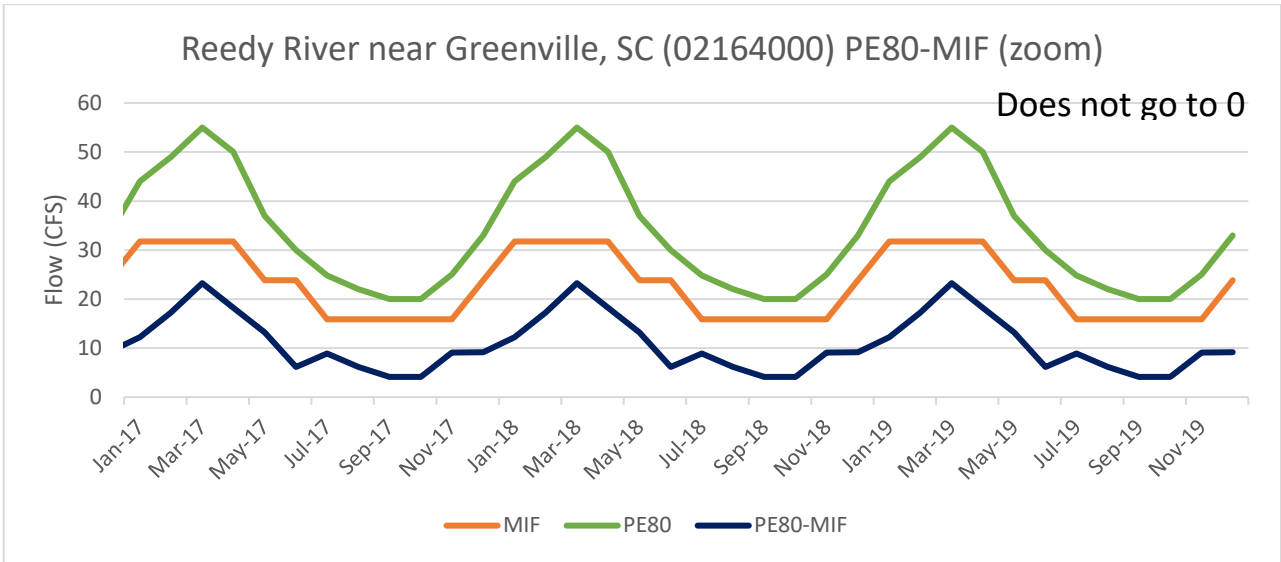
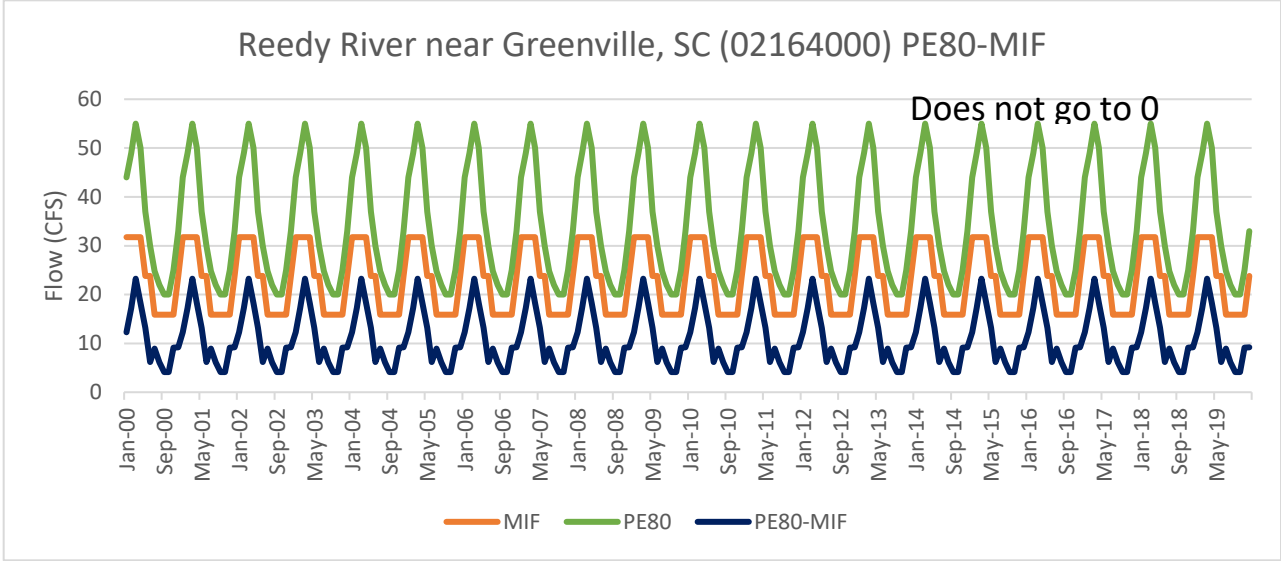
10th Percentile (PE90) – MIF

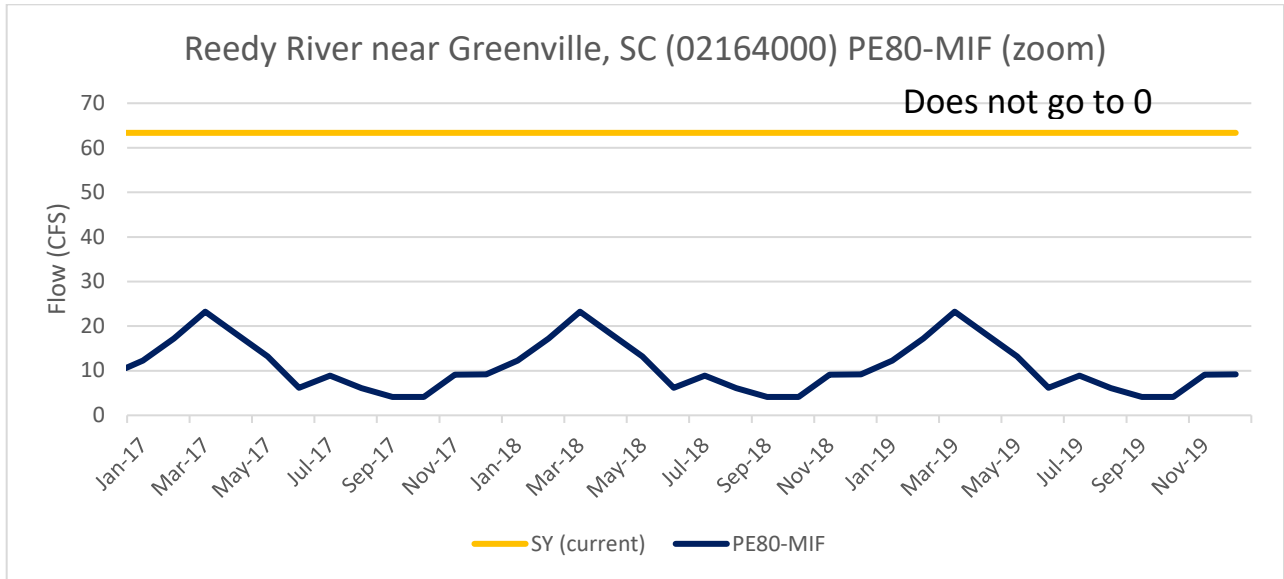




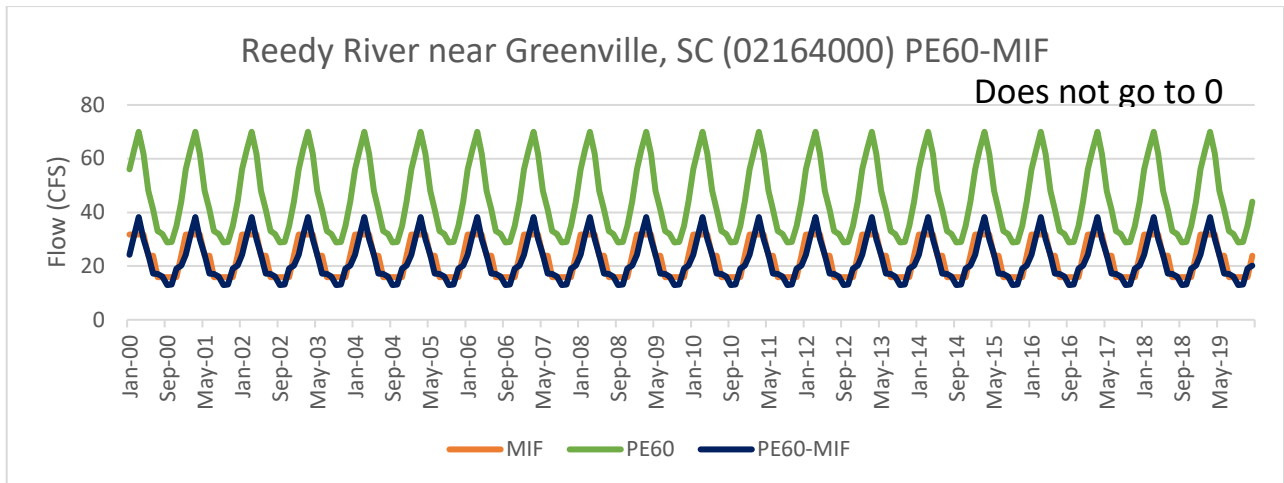
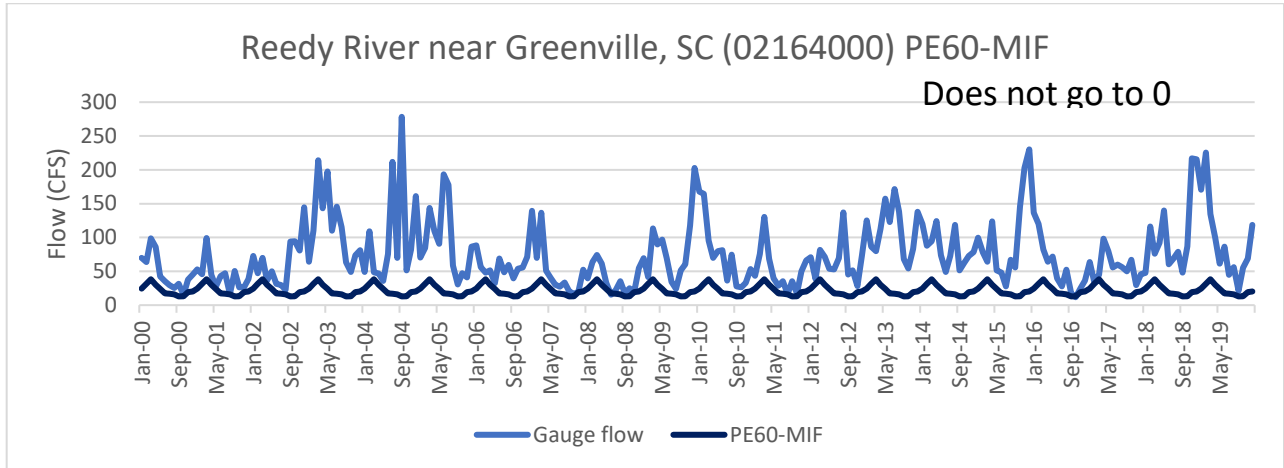
20th Percentile (PE80) – MIF

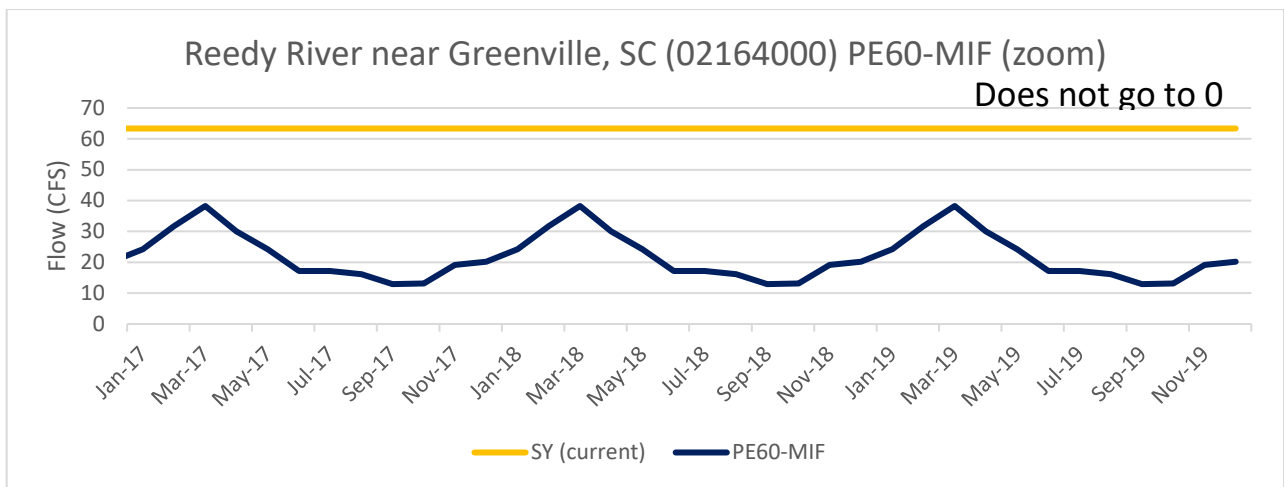
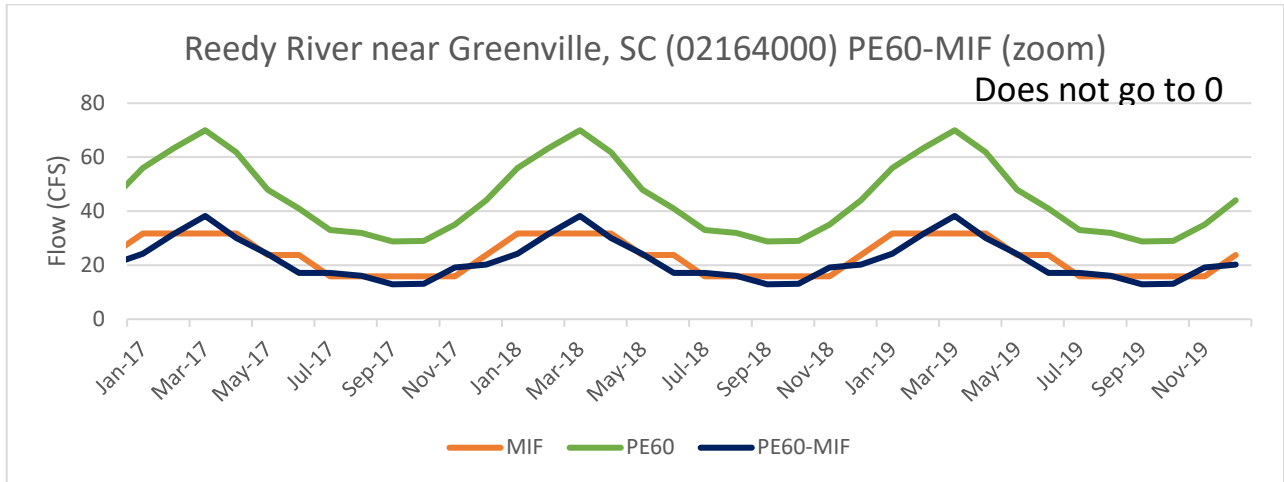




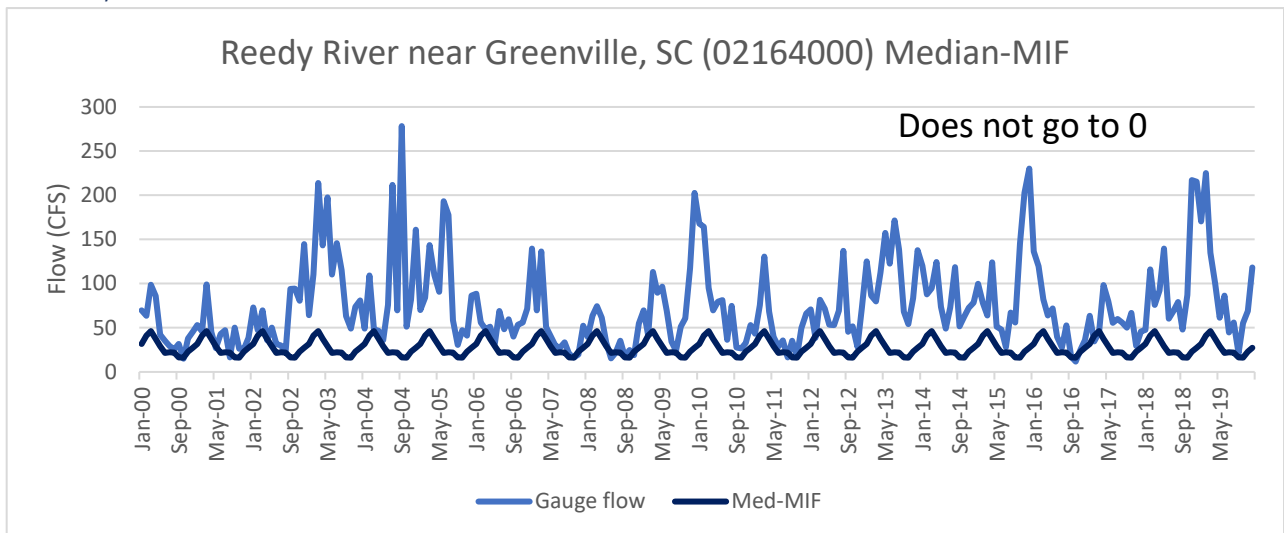


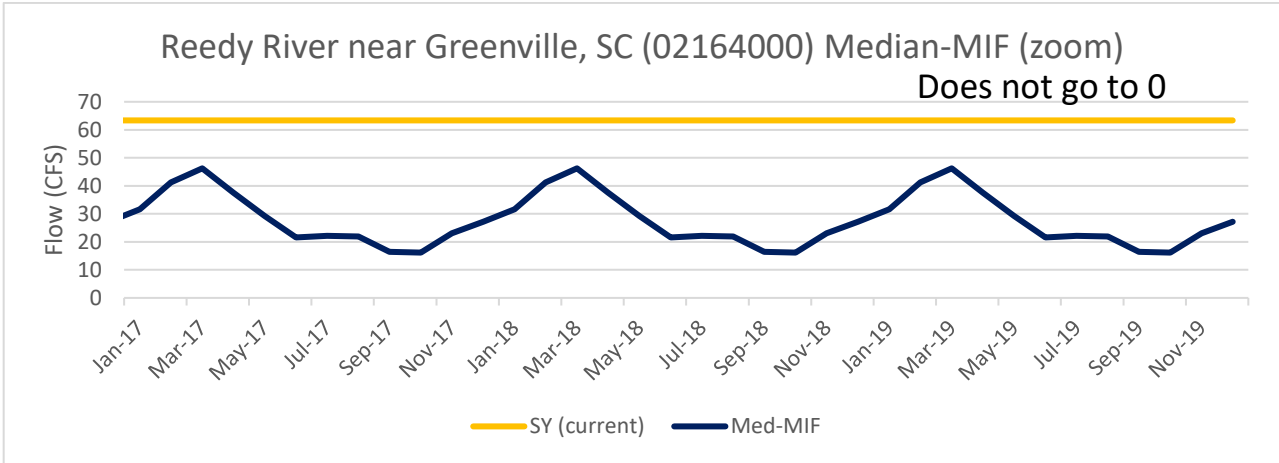
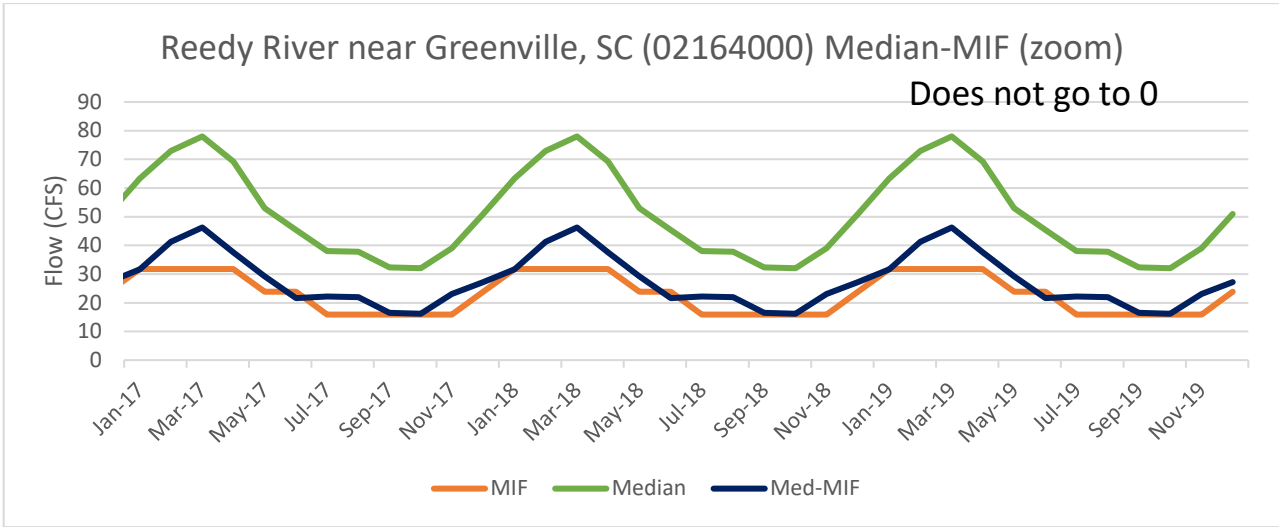
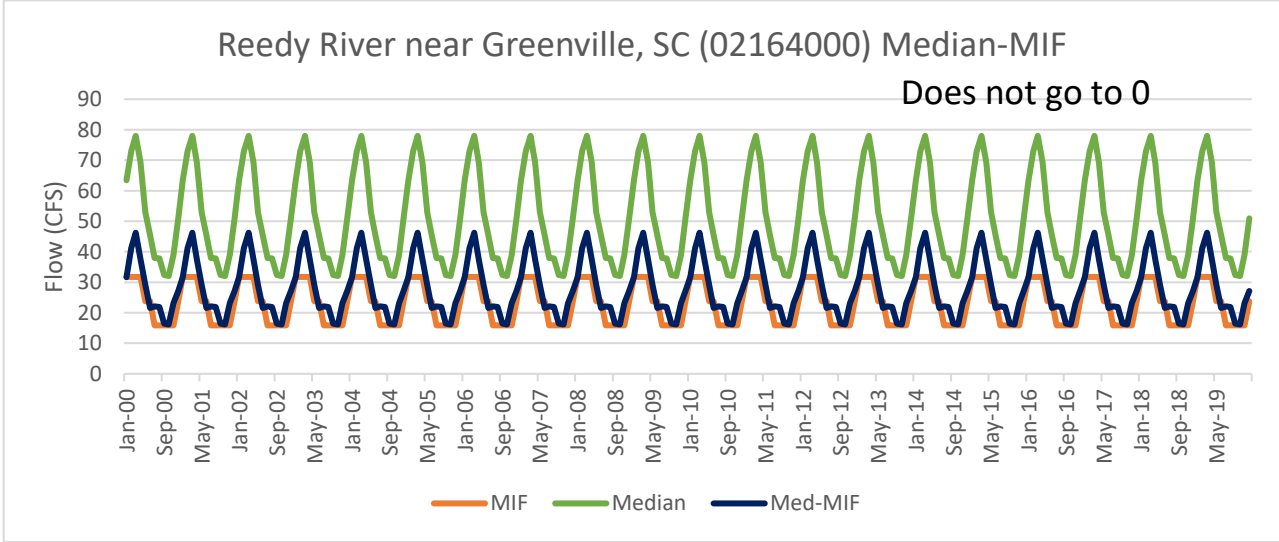
40th Percentile (PE60) – MIF



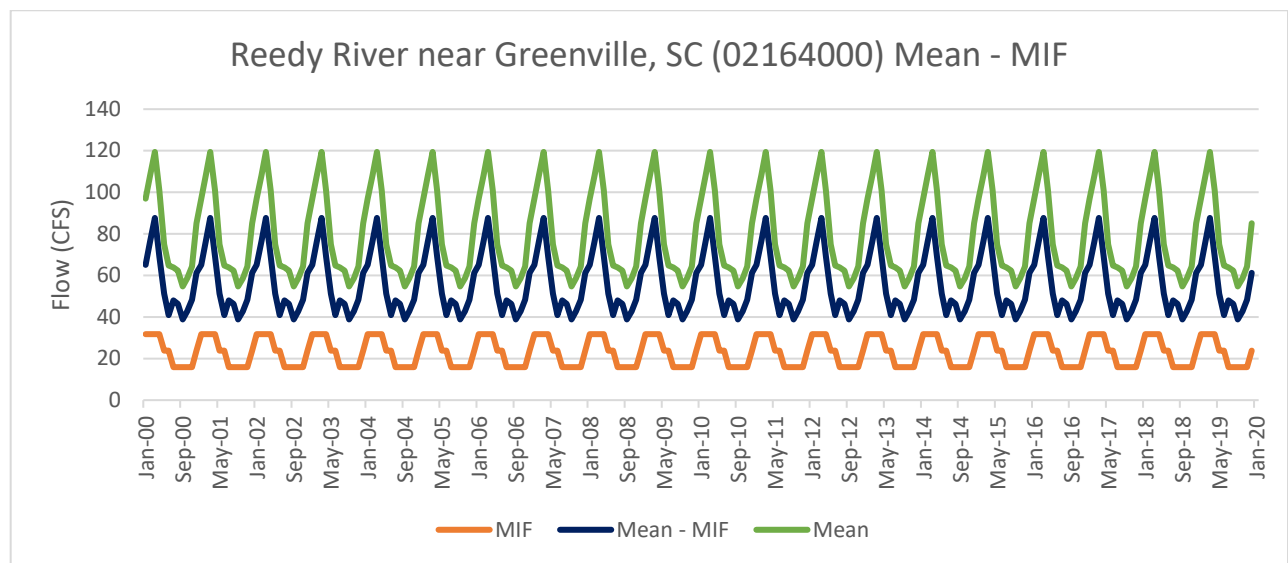
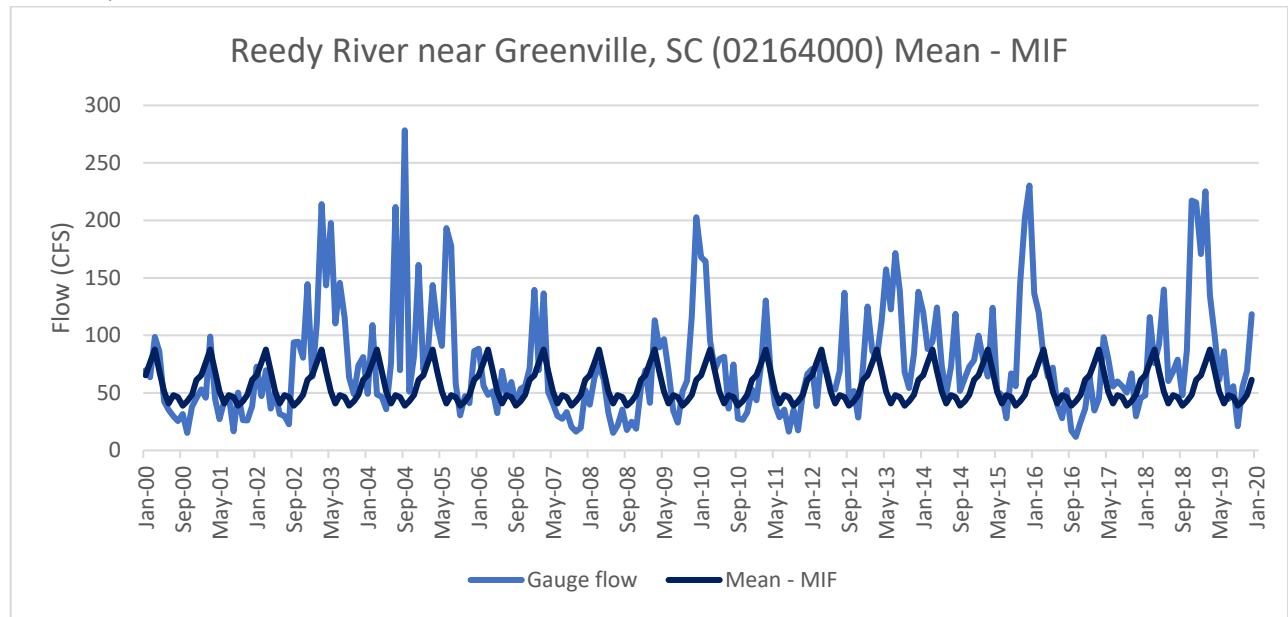


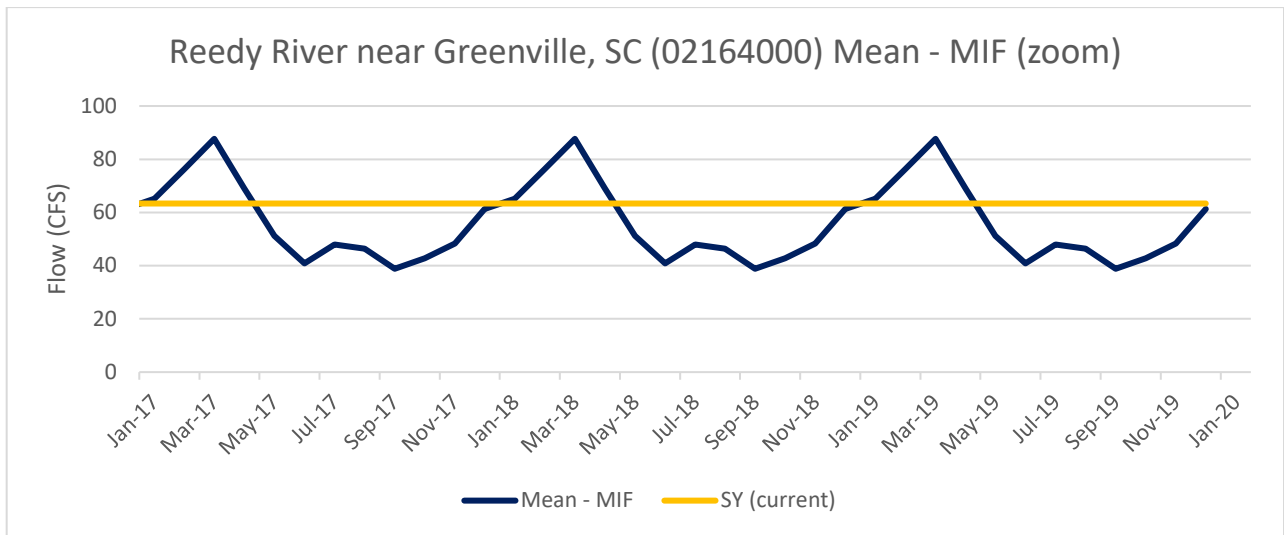
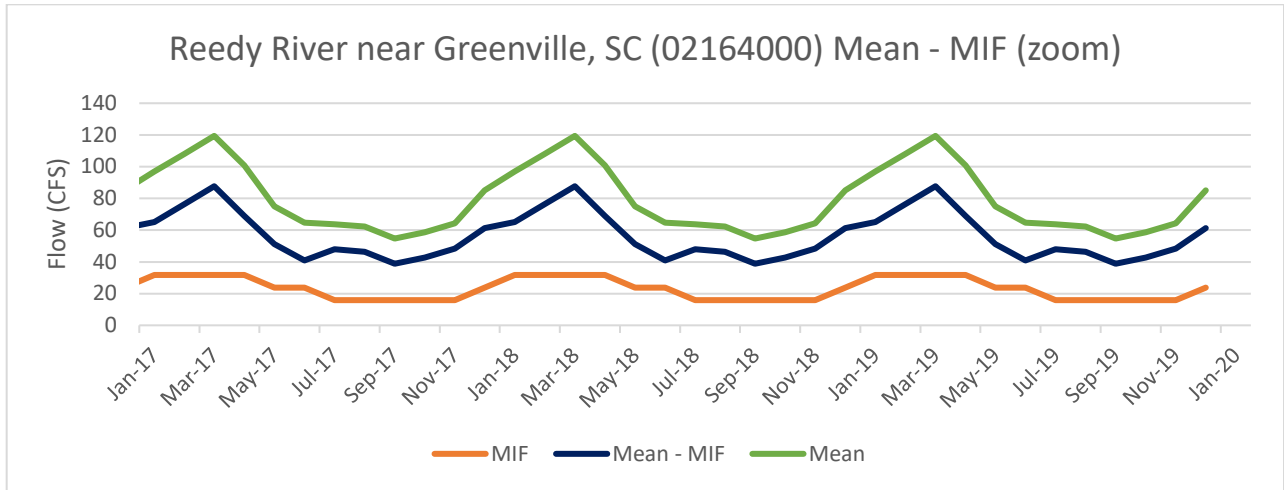
Monthly Median – MIF



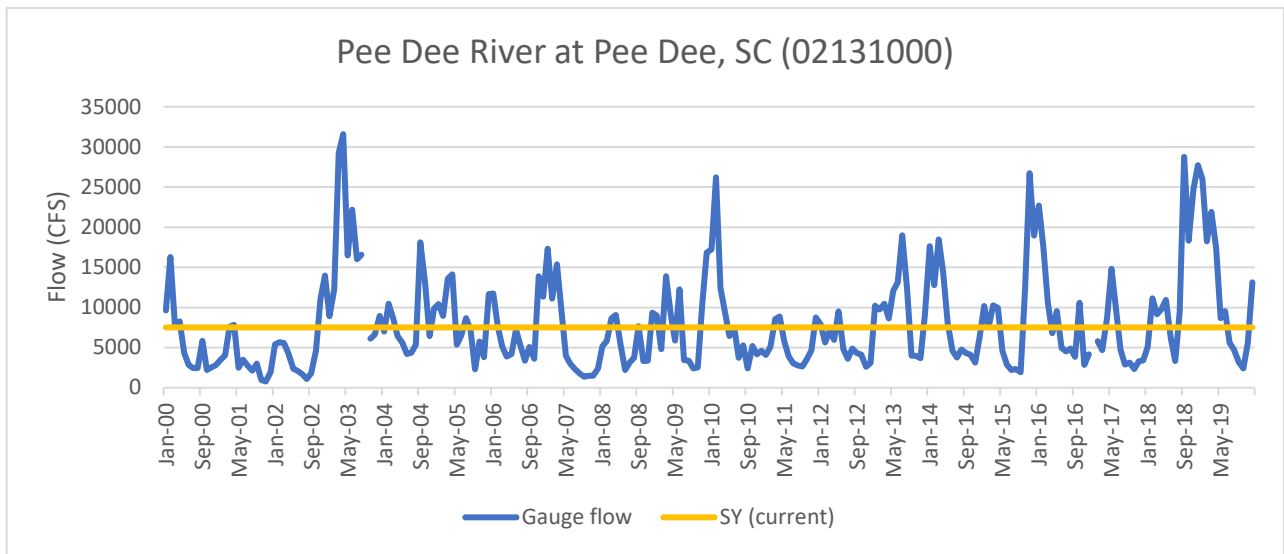


Monthly Mean – MIF

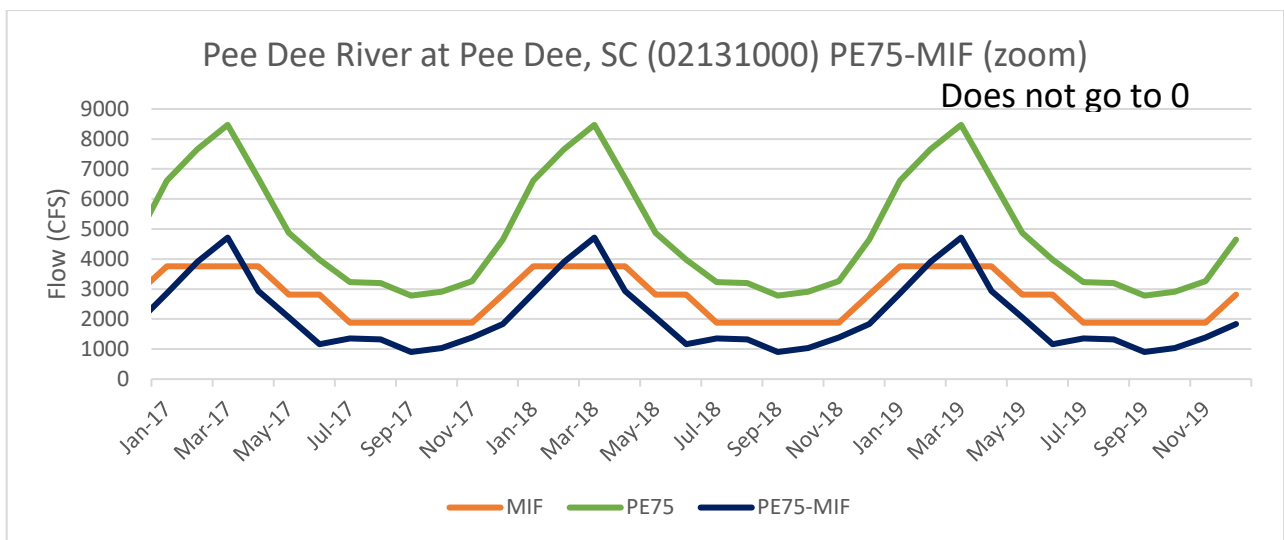
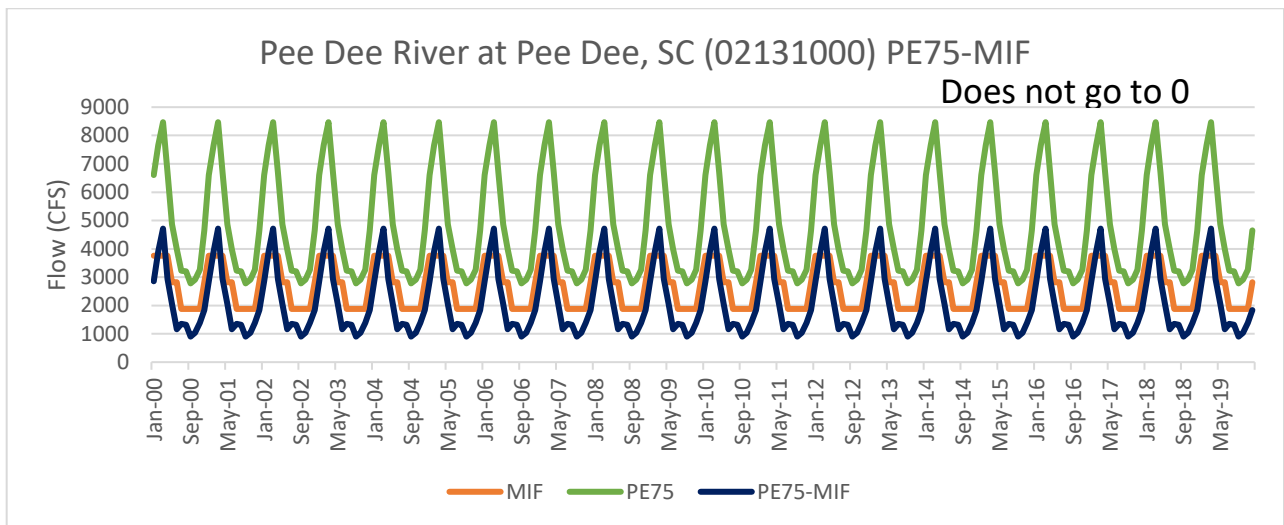
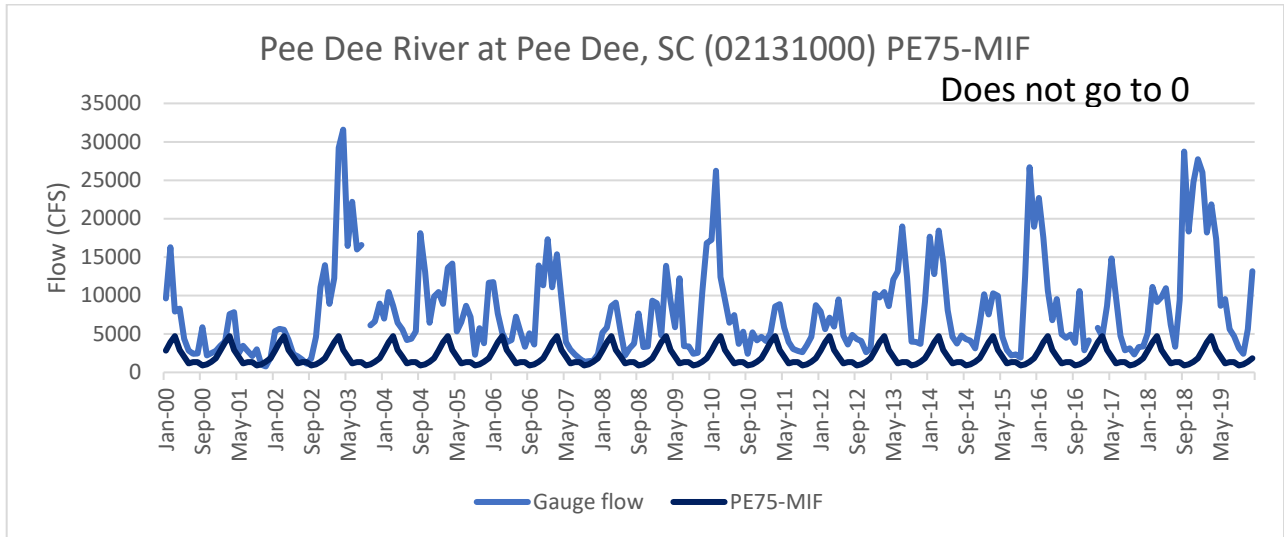


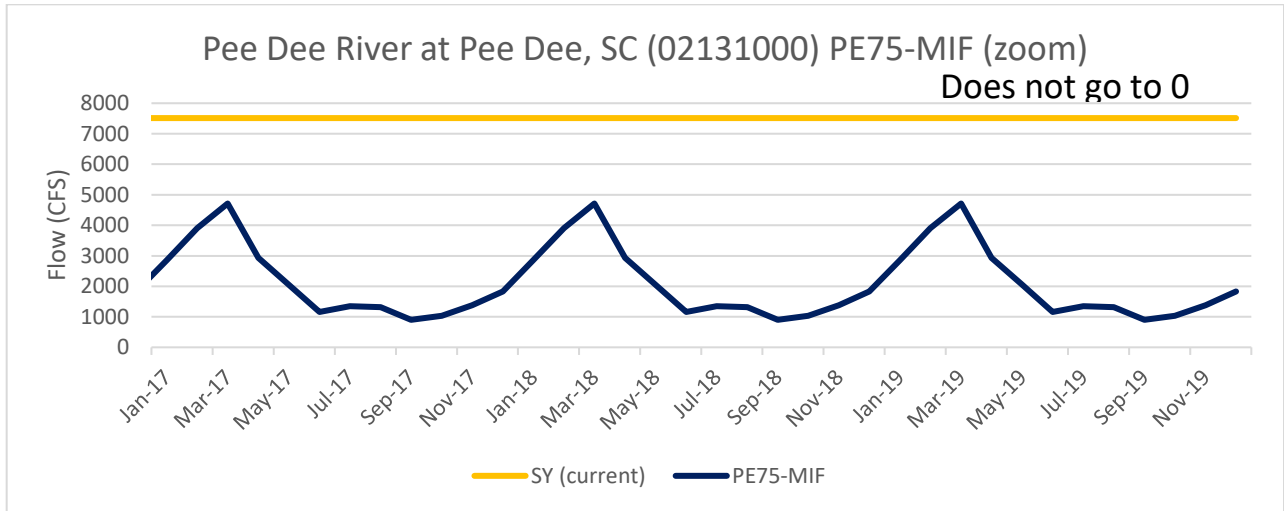


Pee Dee River at Pee Dee, SC (02131000)

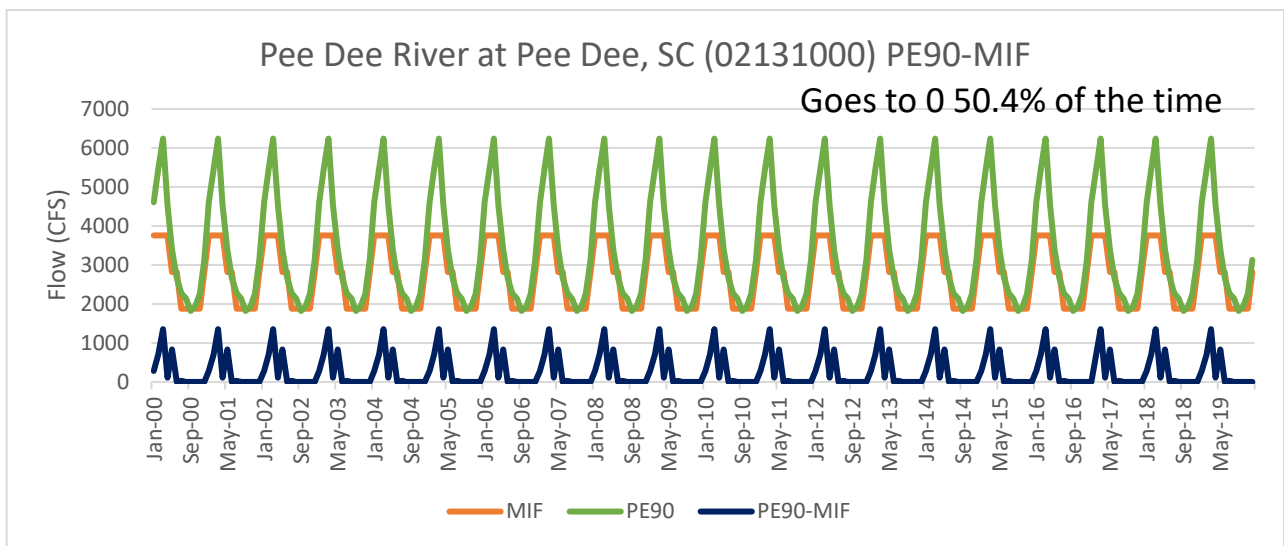
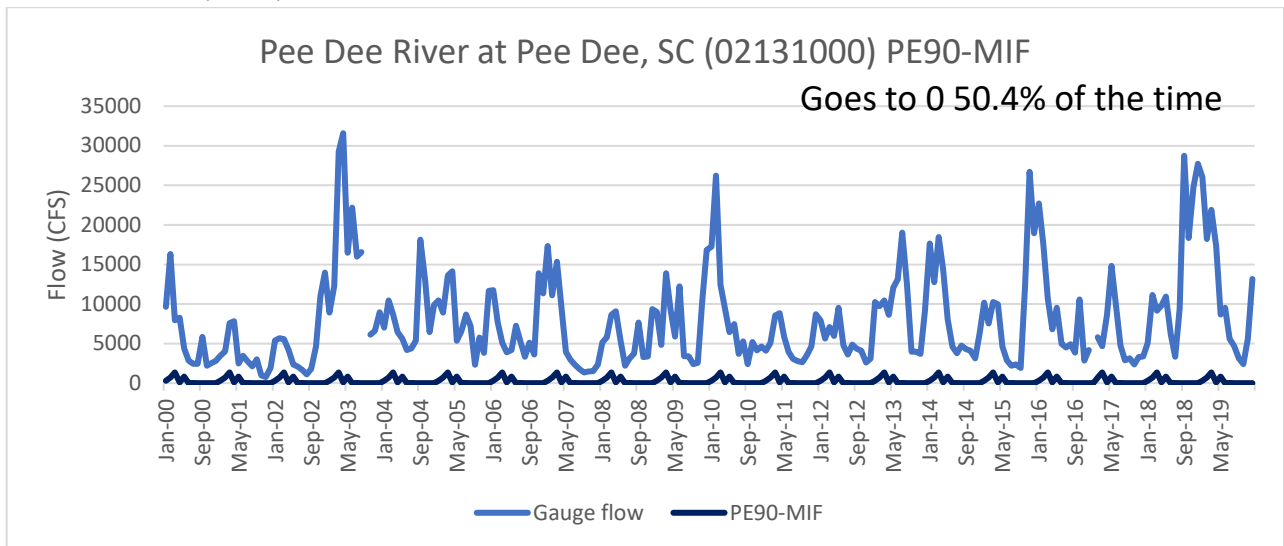


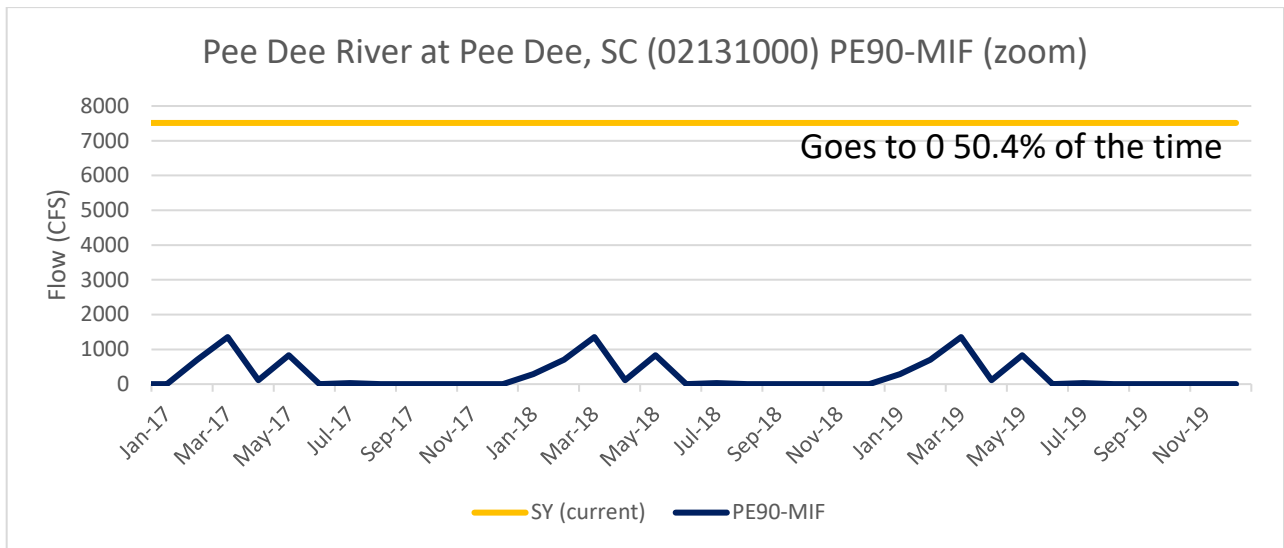
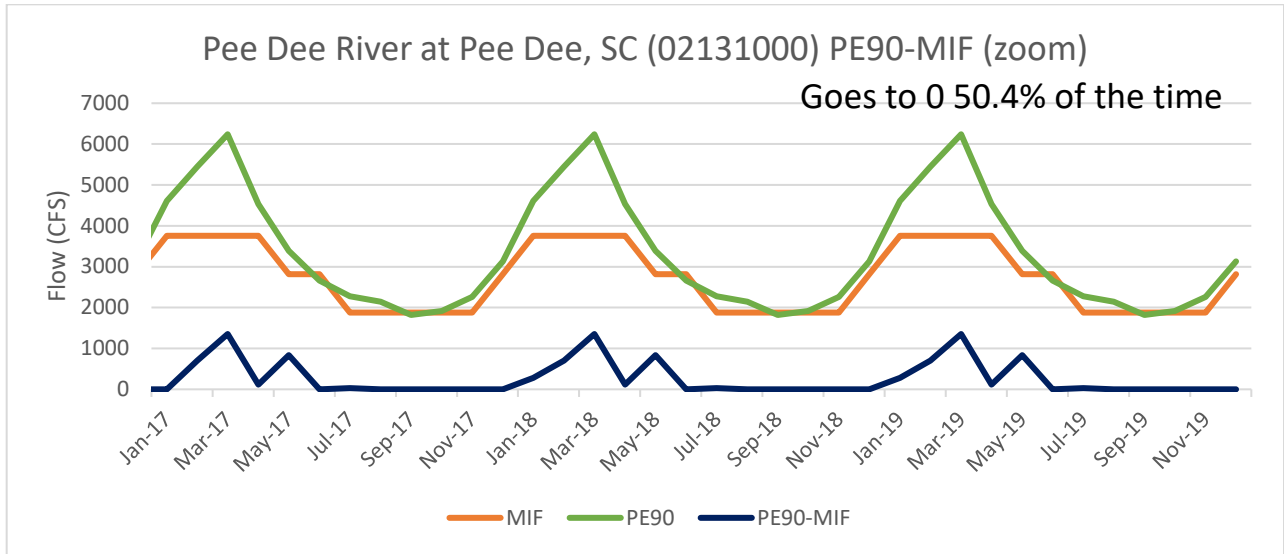
25th Percentile (PE75) – MIF



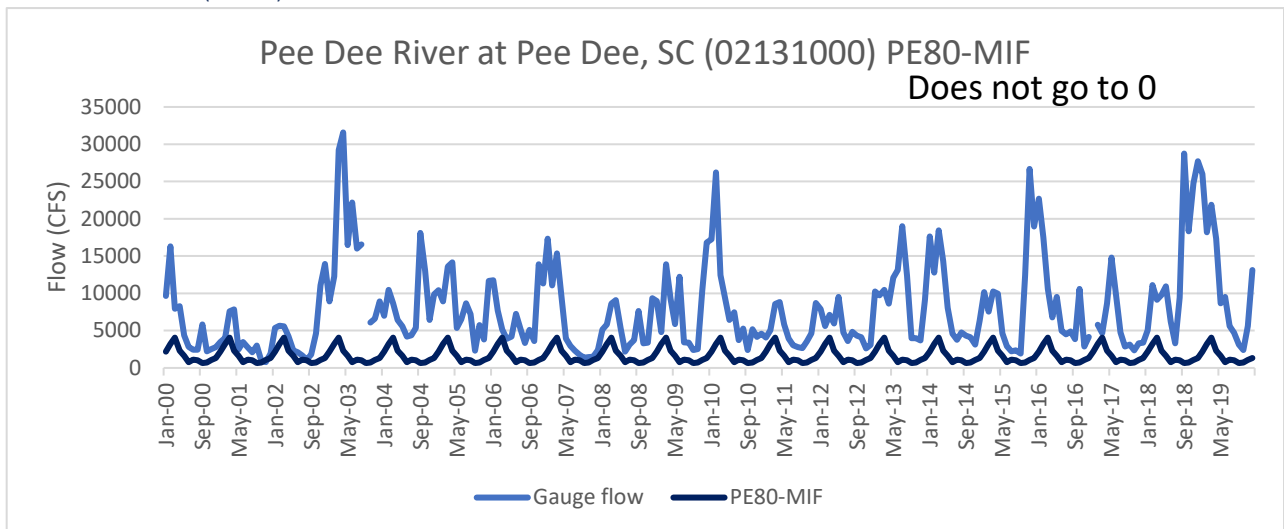


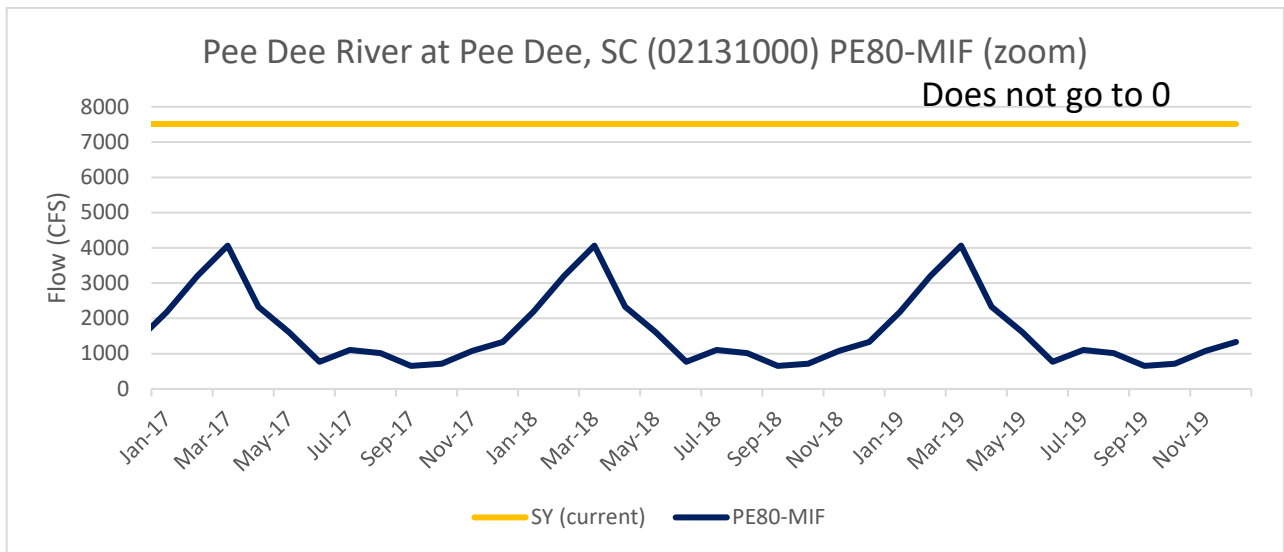
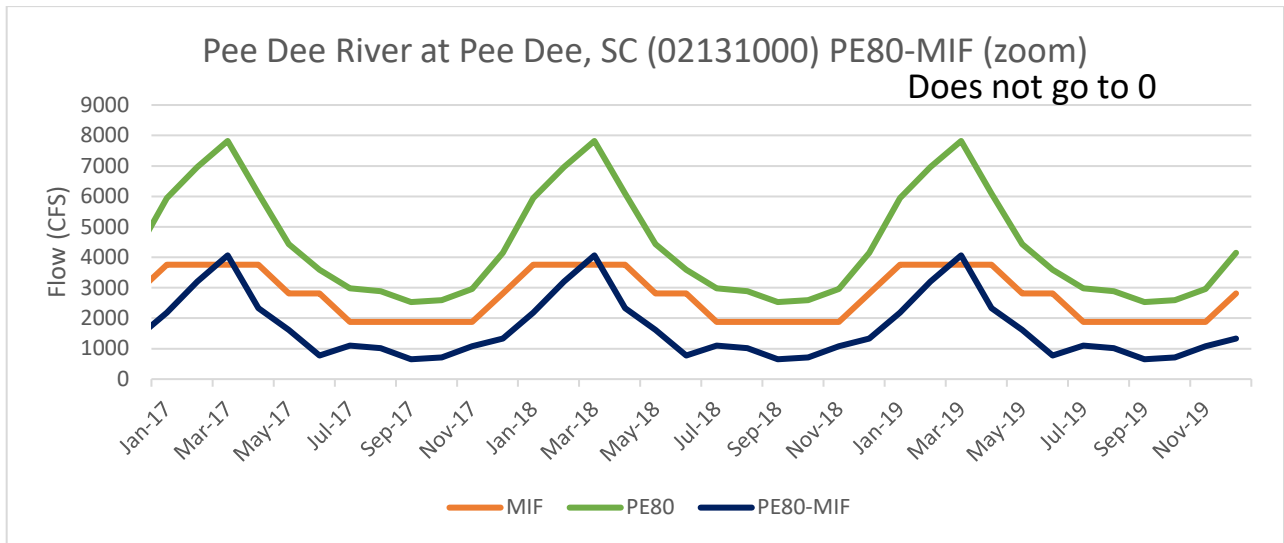
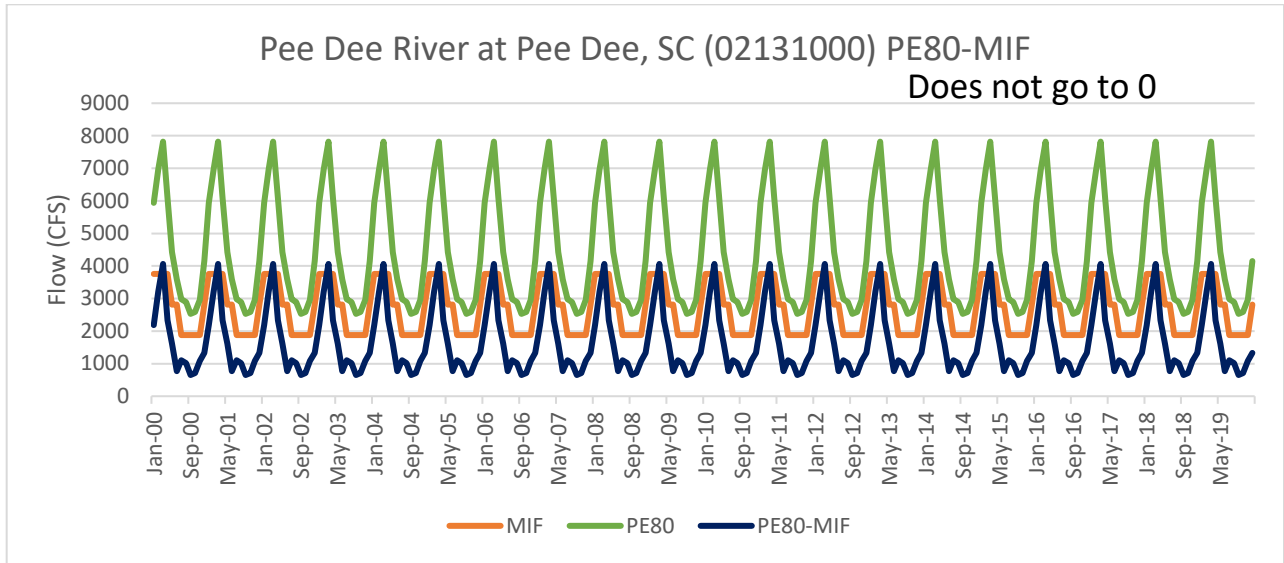
10th Percentile (PE90) – MIF



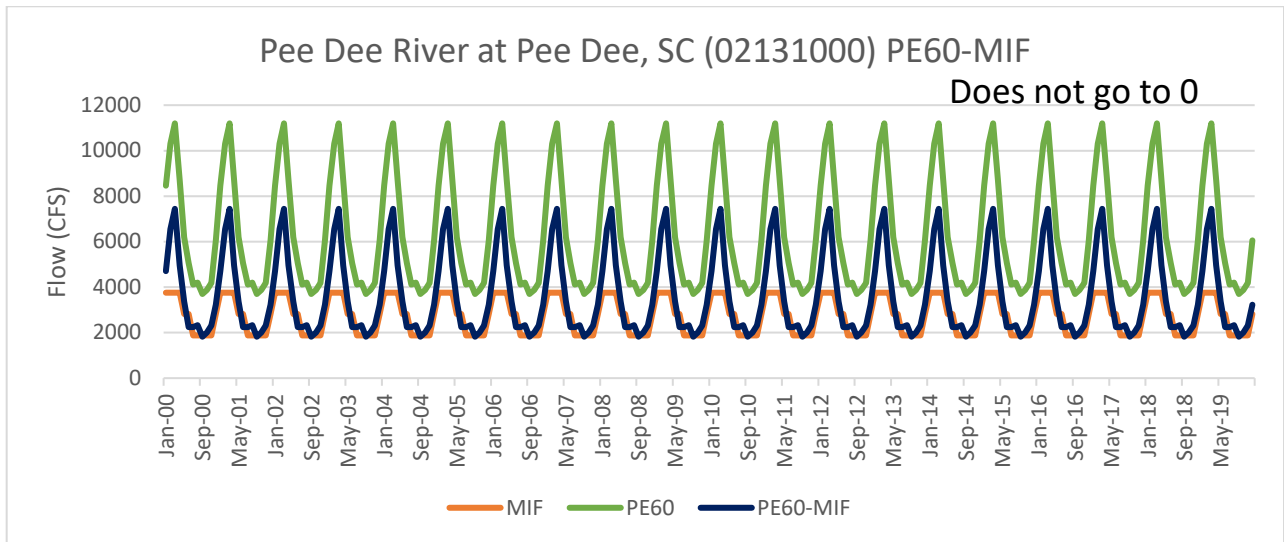
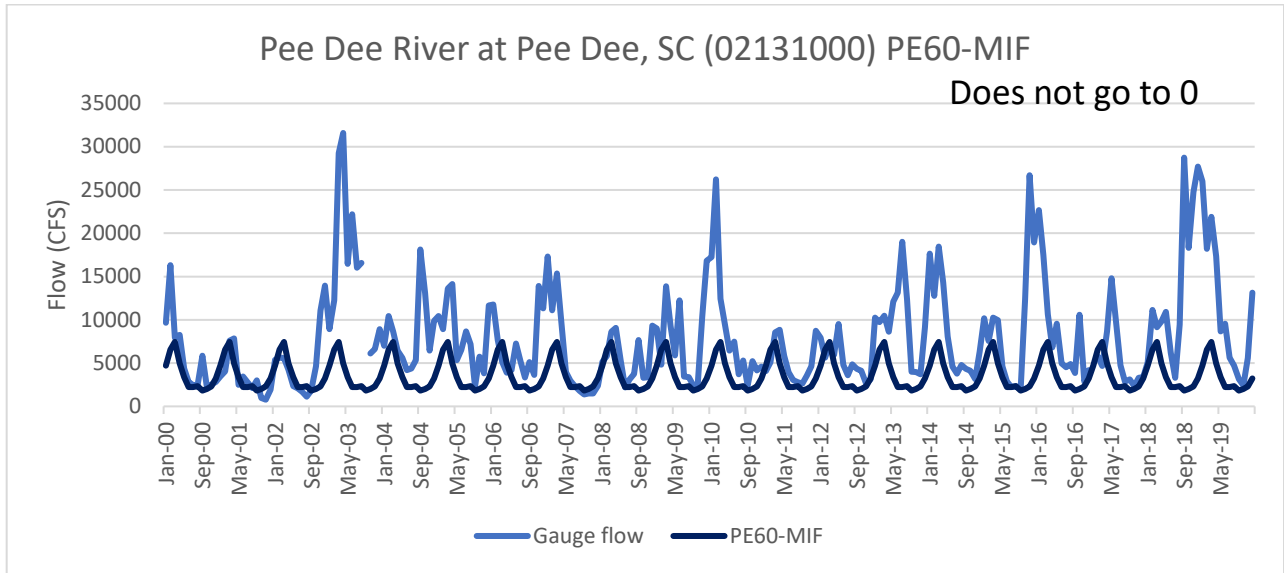


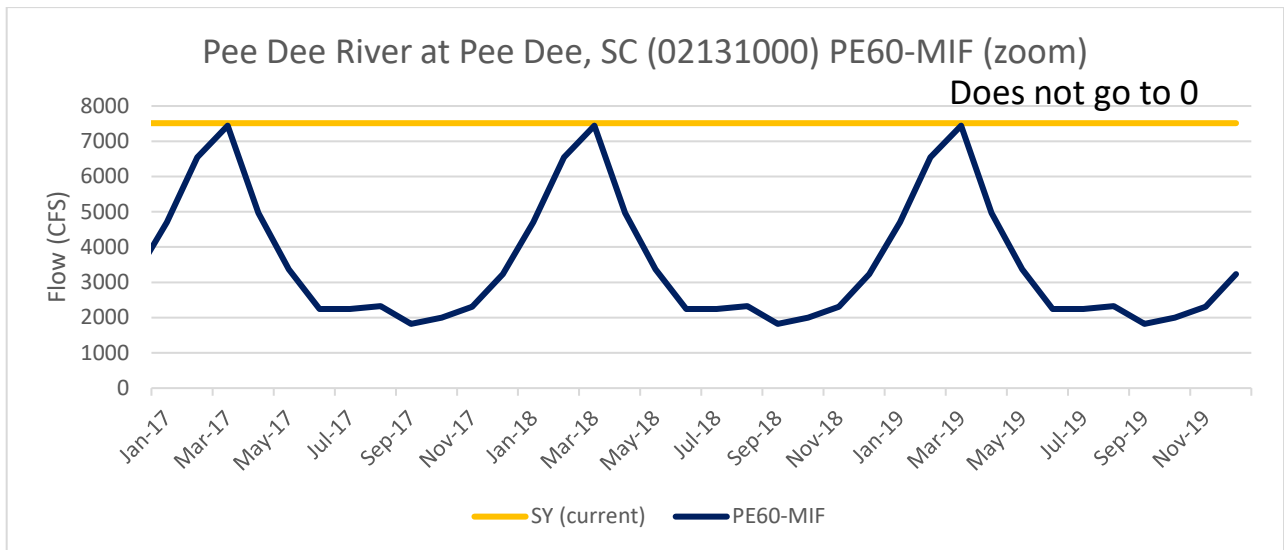
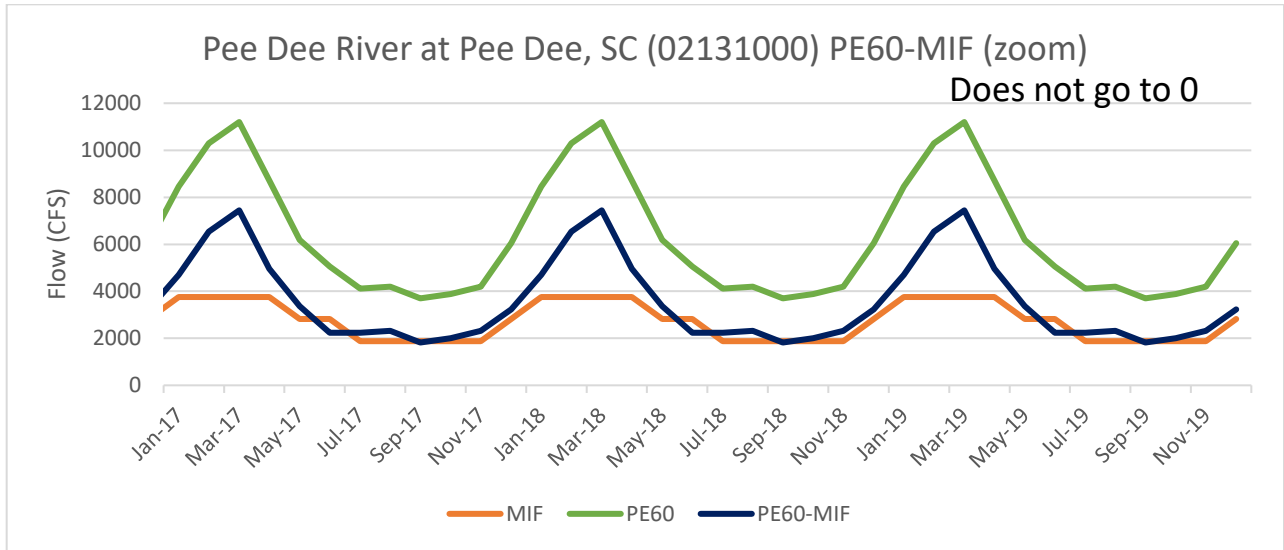
20th Percentile (PE80) – MIF



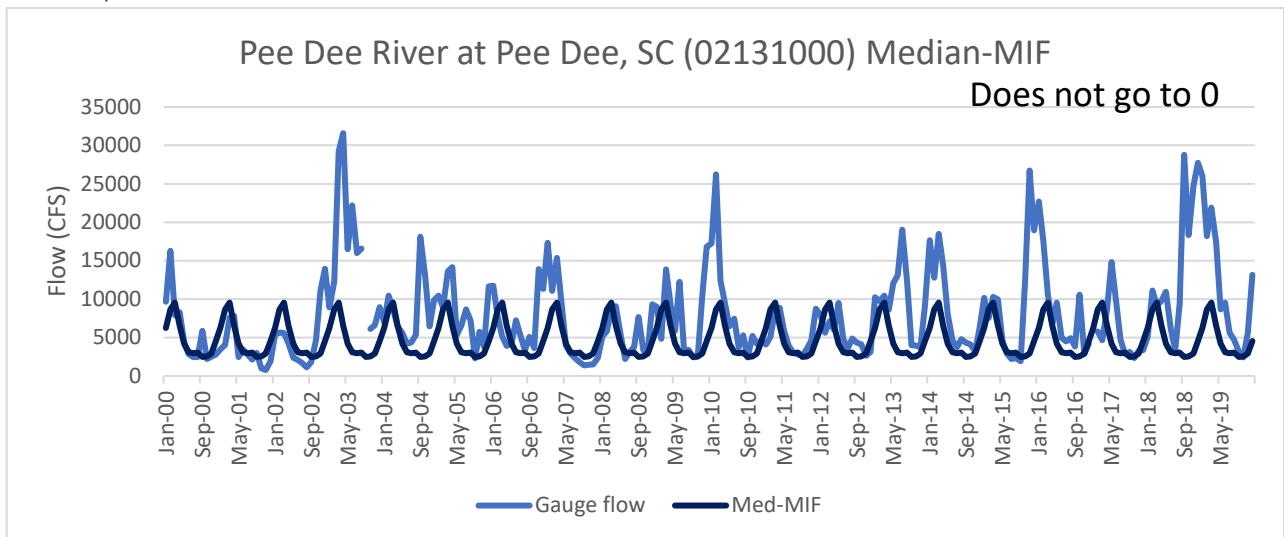


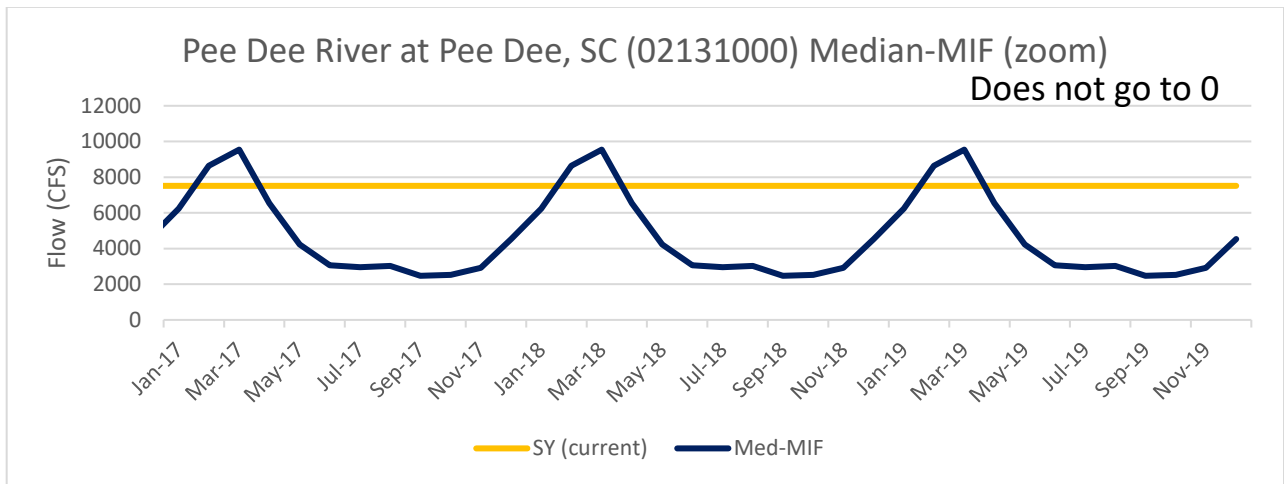
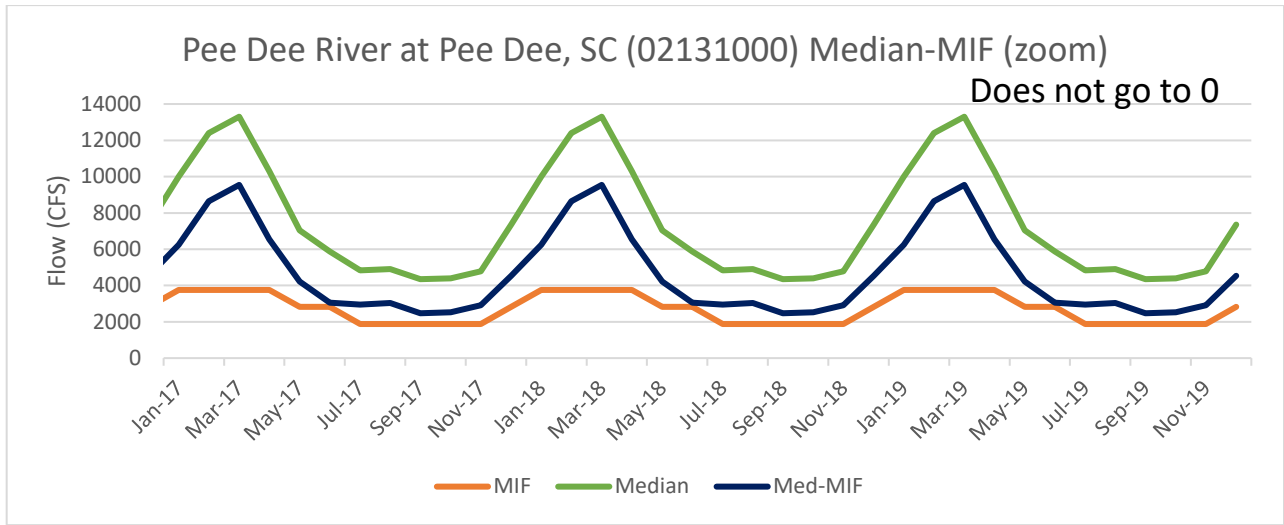
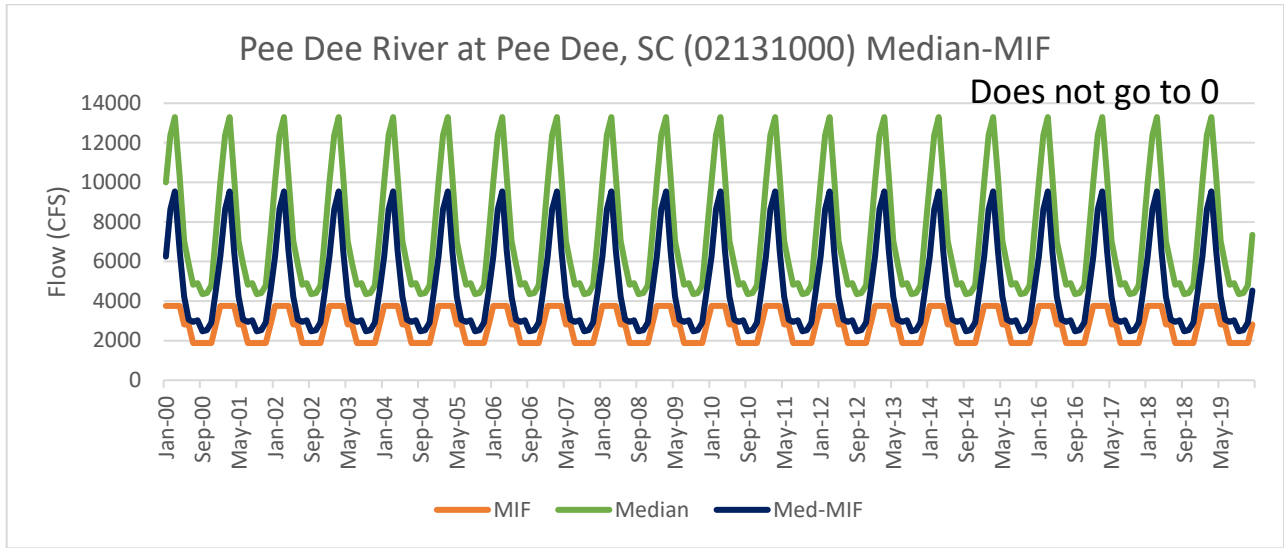
40th Percentile (PE60) – MIF



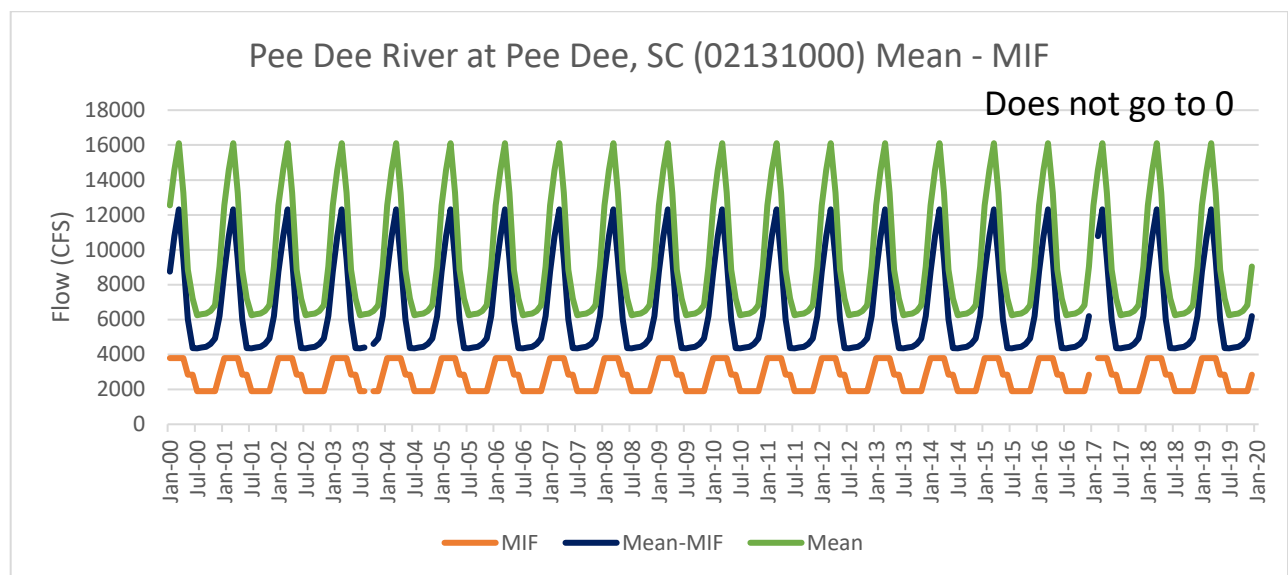
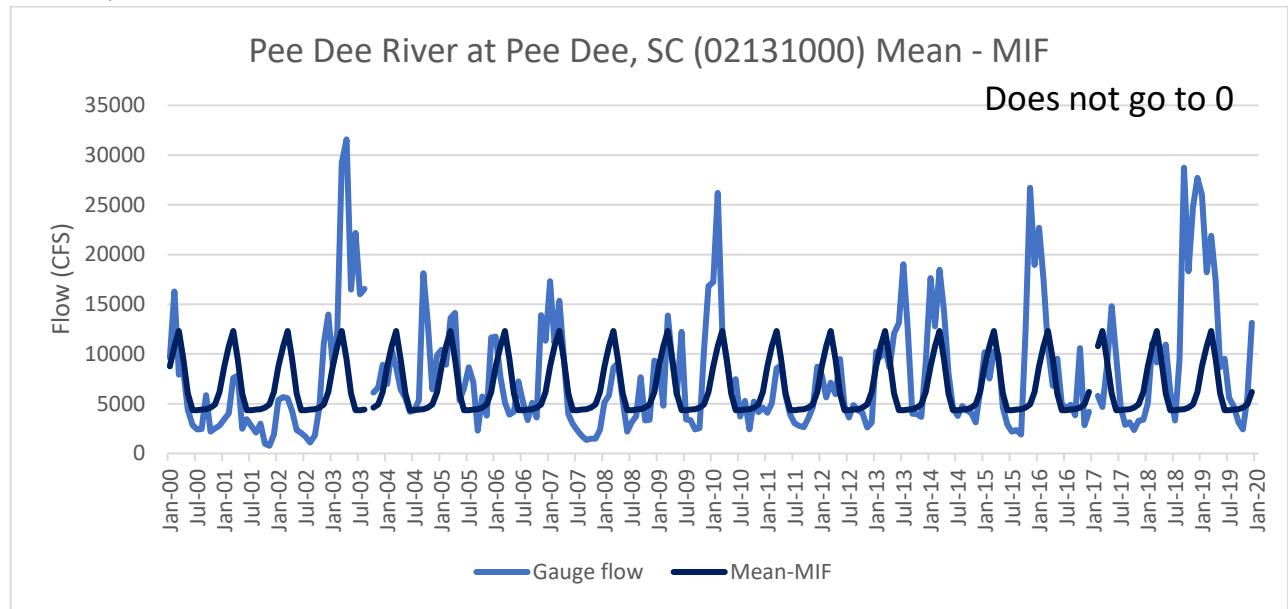


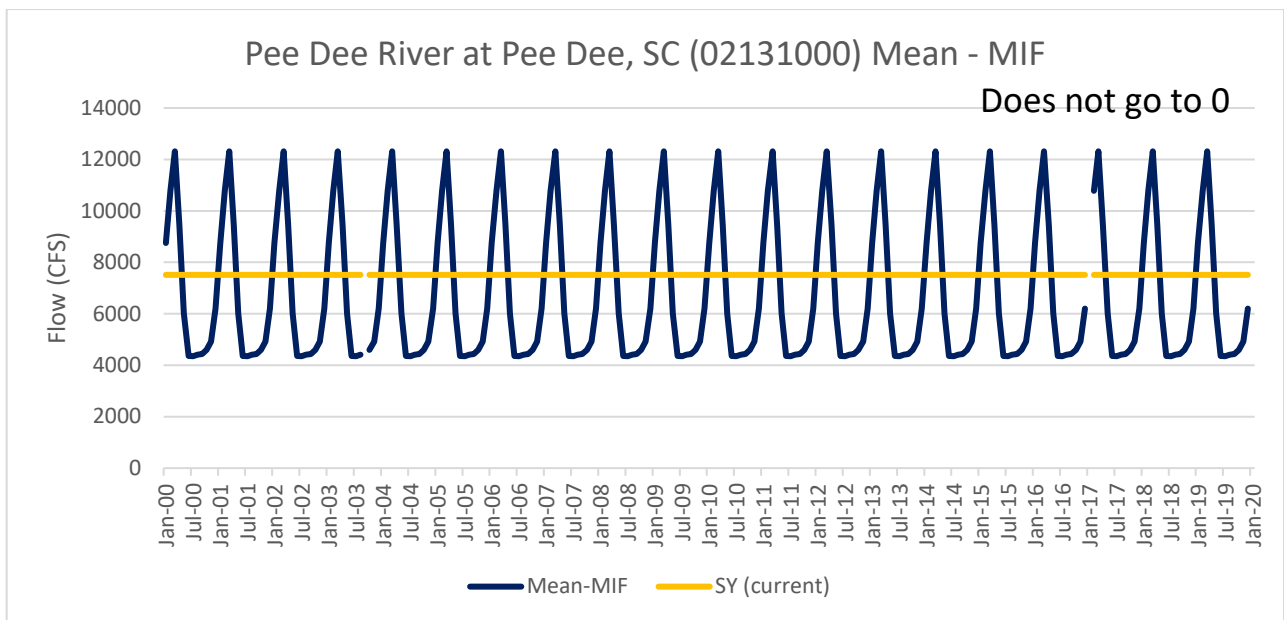
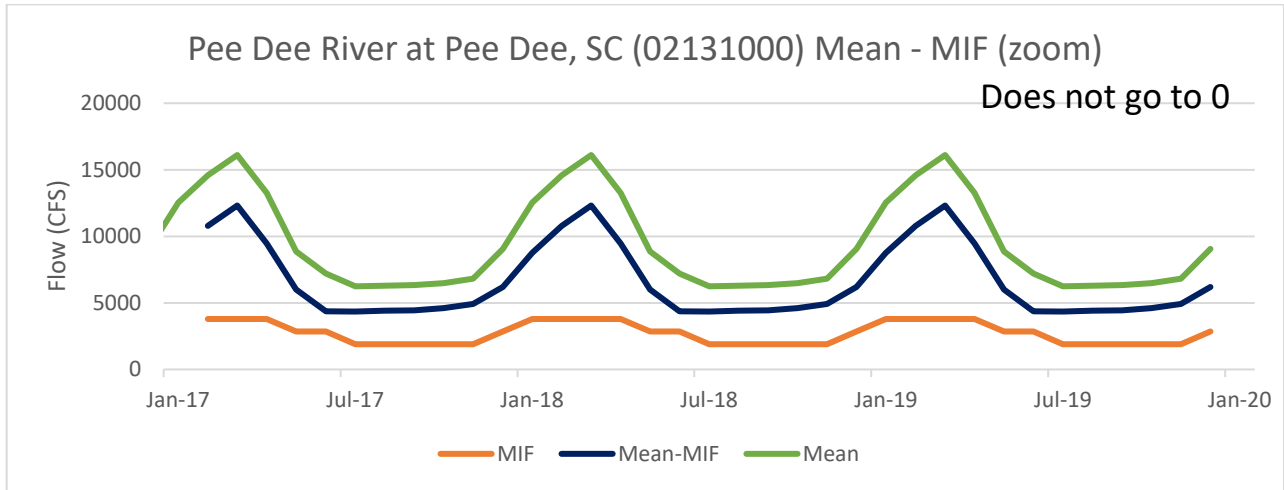
Monthly Median – MIF



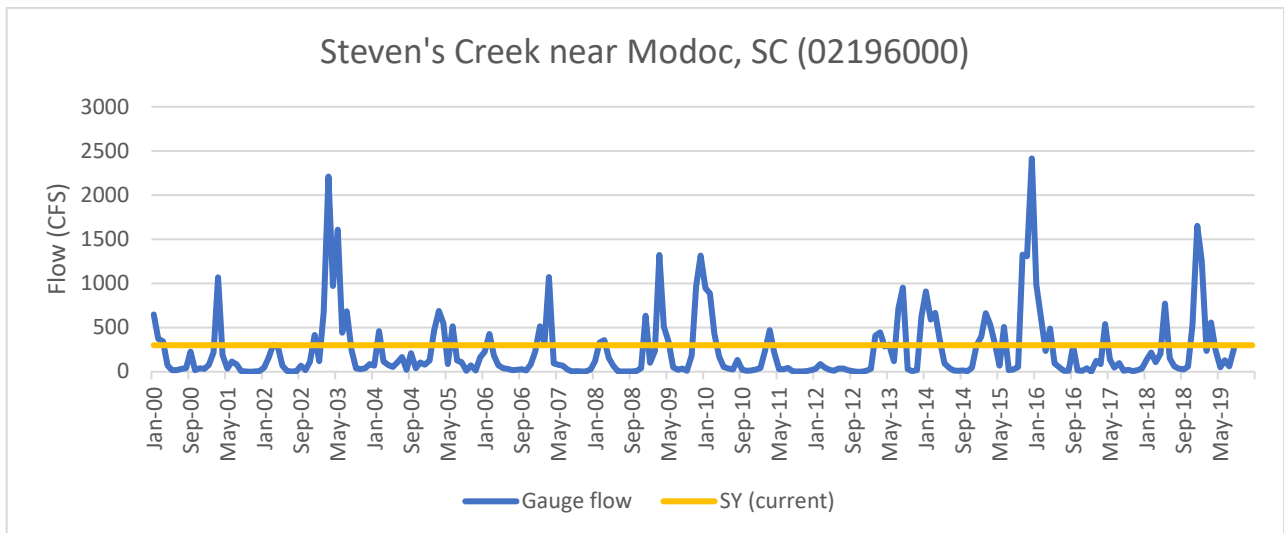


Monthly Mean – MIF

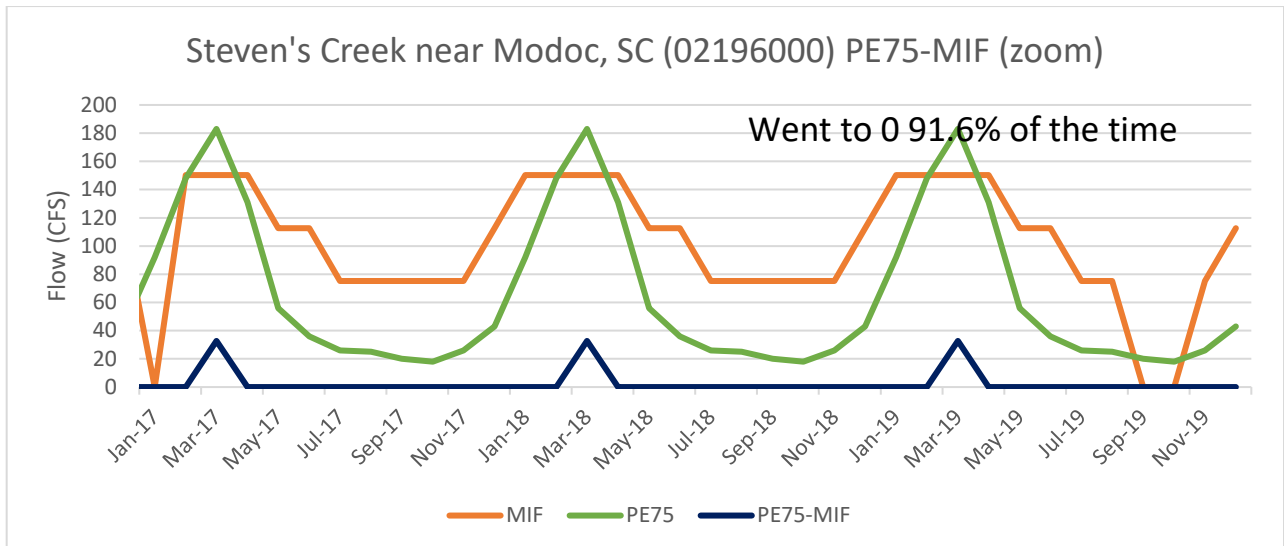
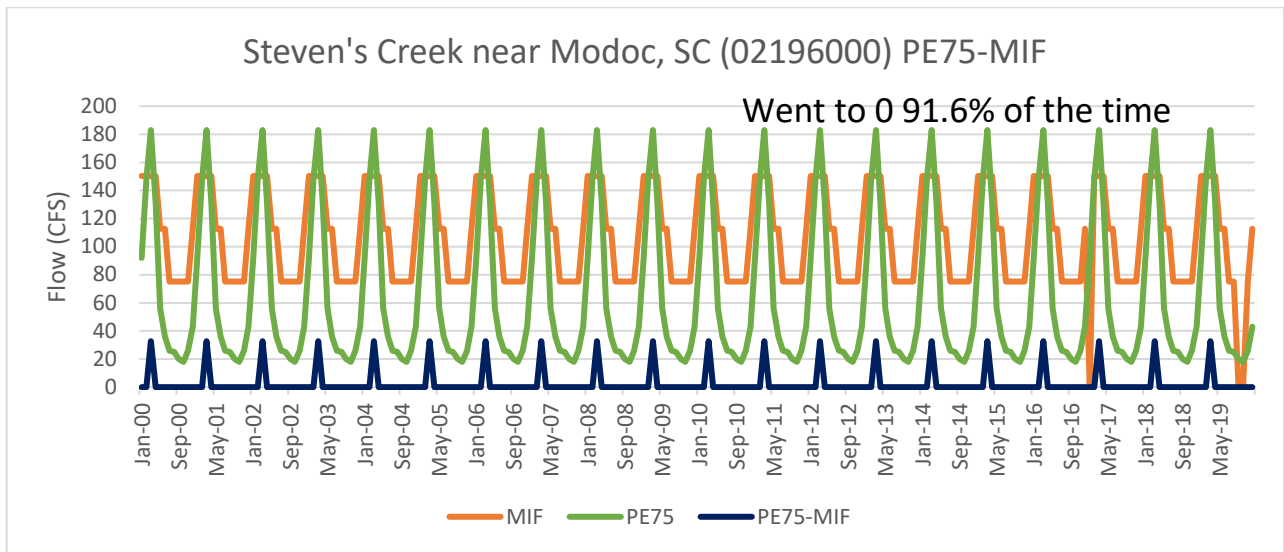
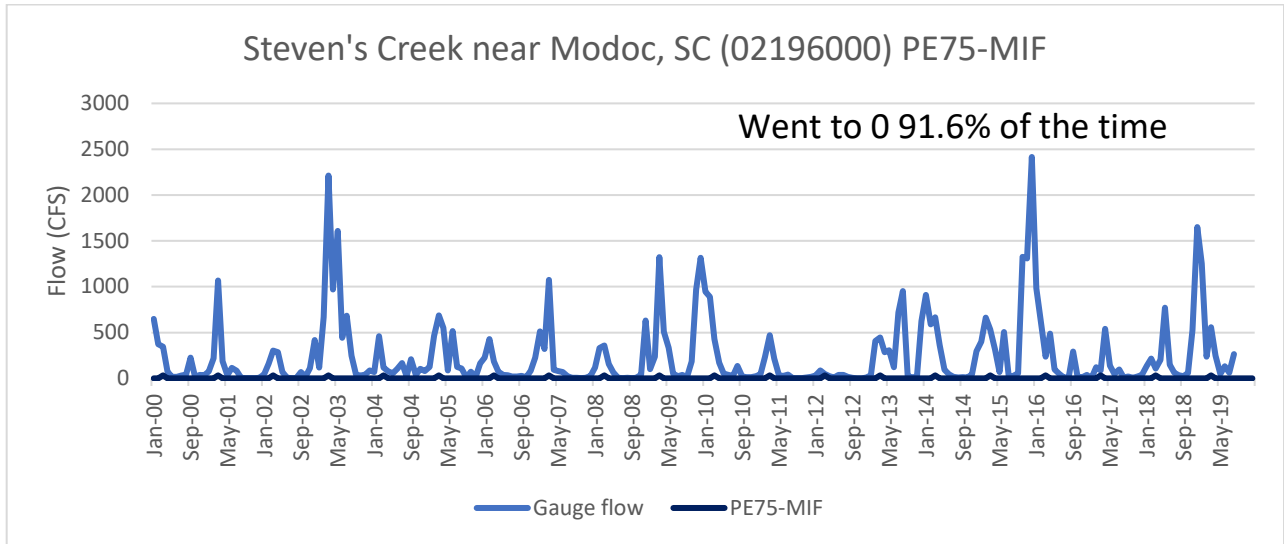


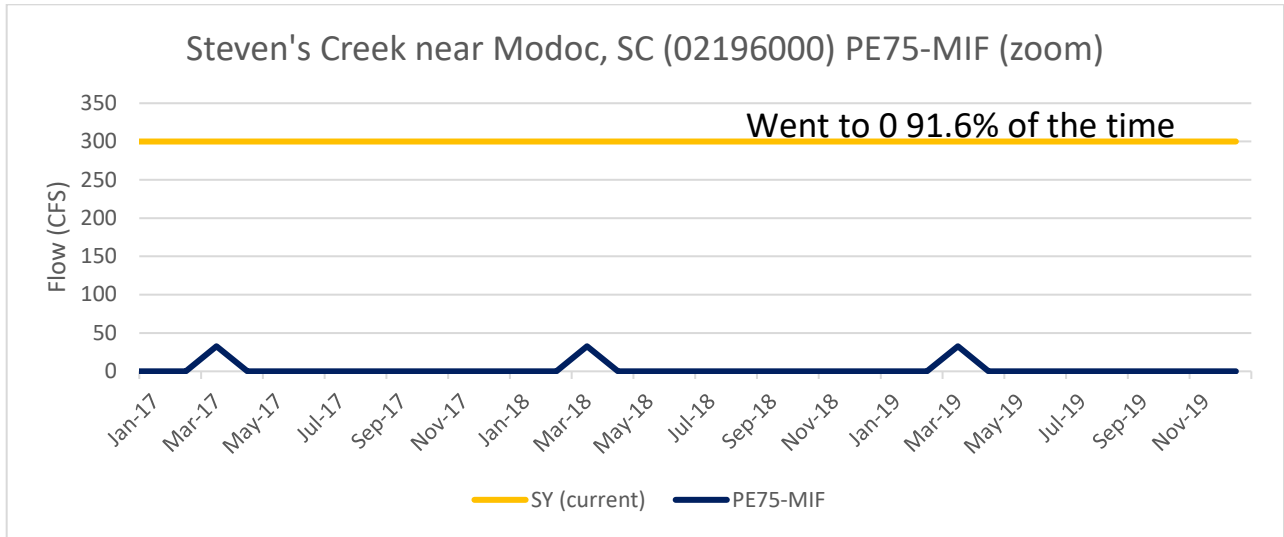


Steven's Creek near Modoc, SC (02196000)

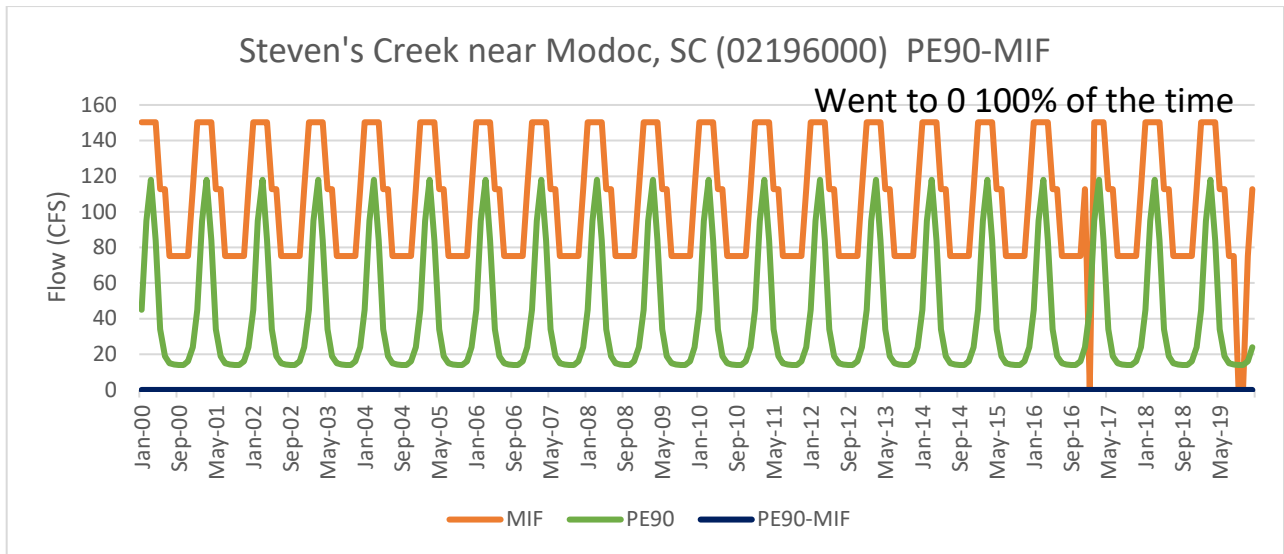
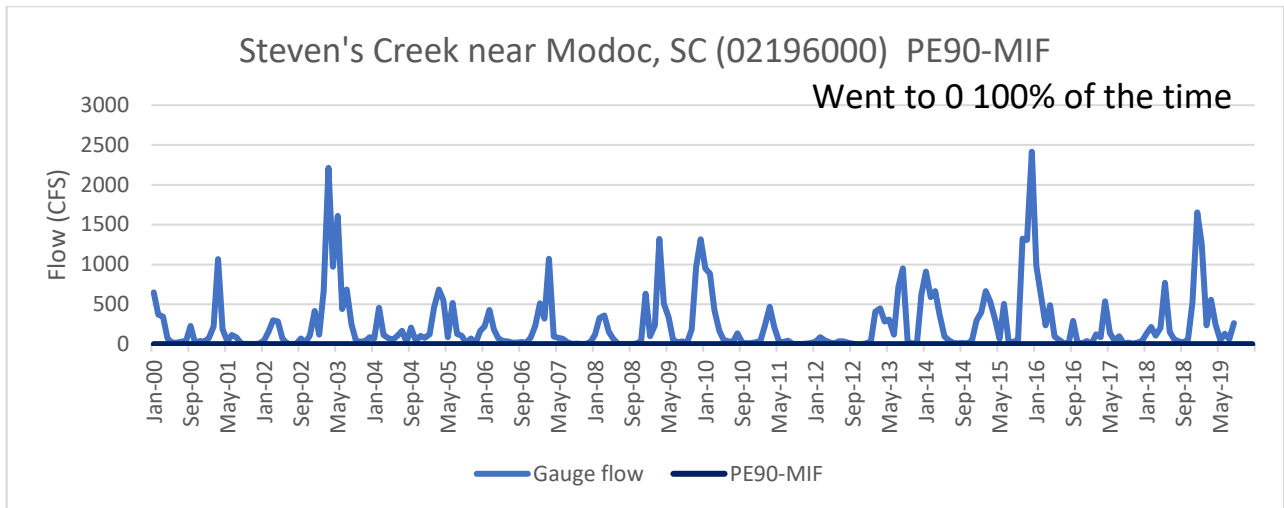


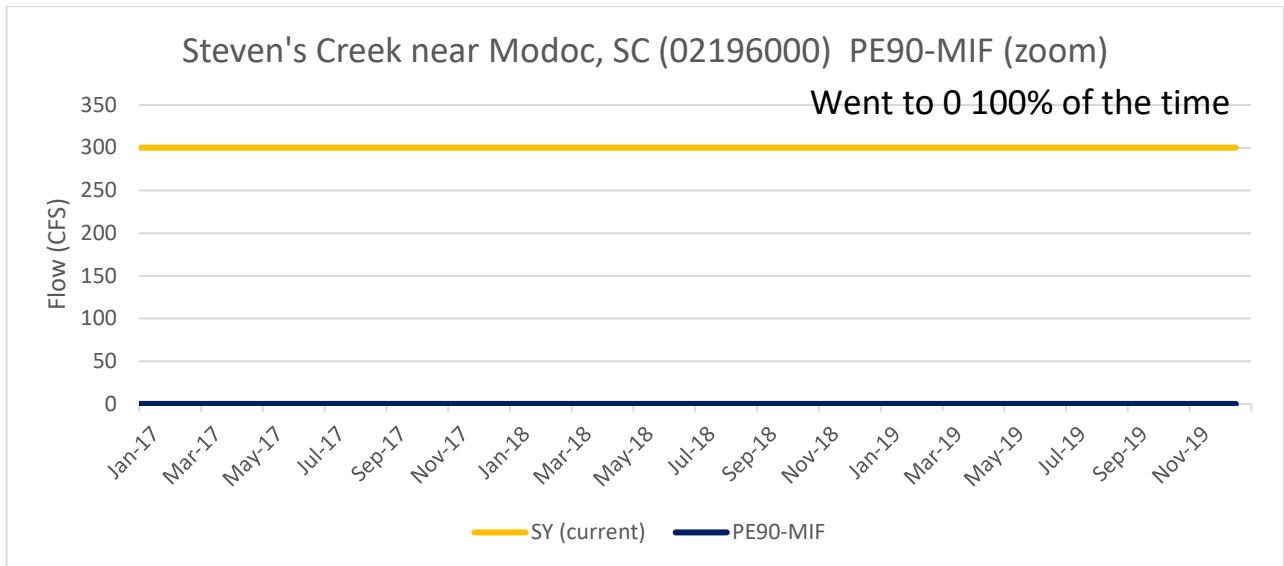
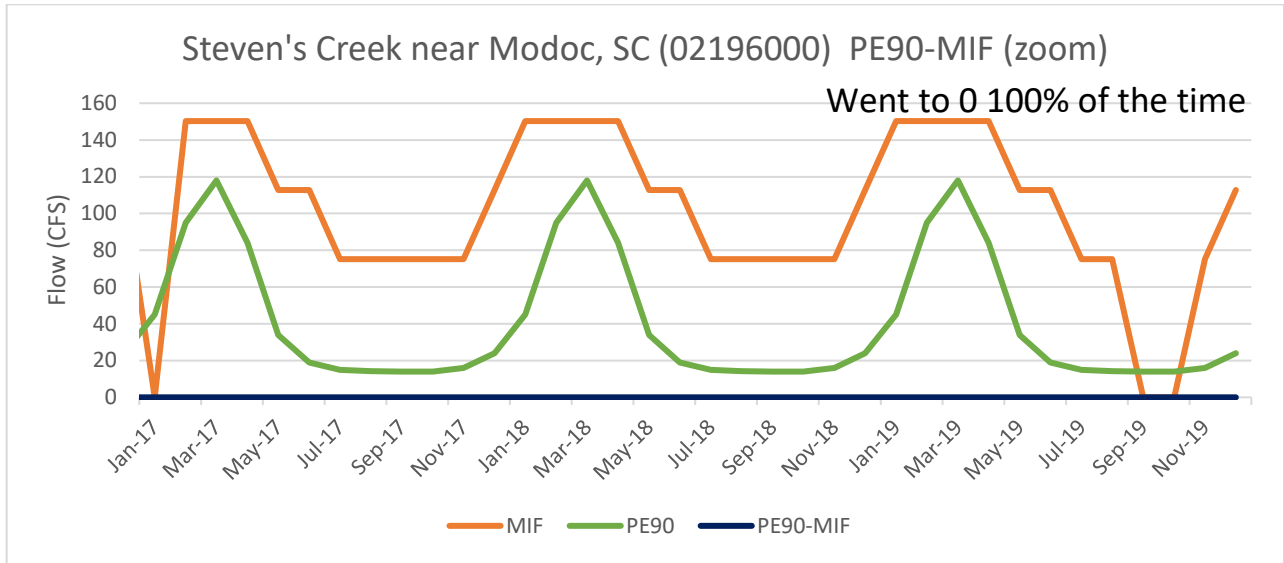
25th Percentile (PE75) – MIF



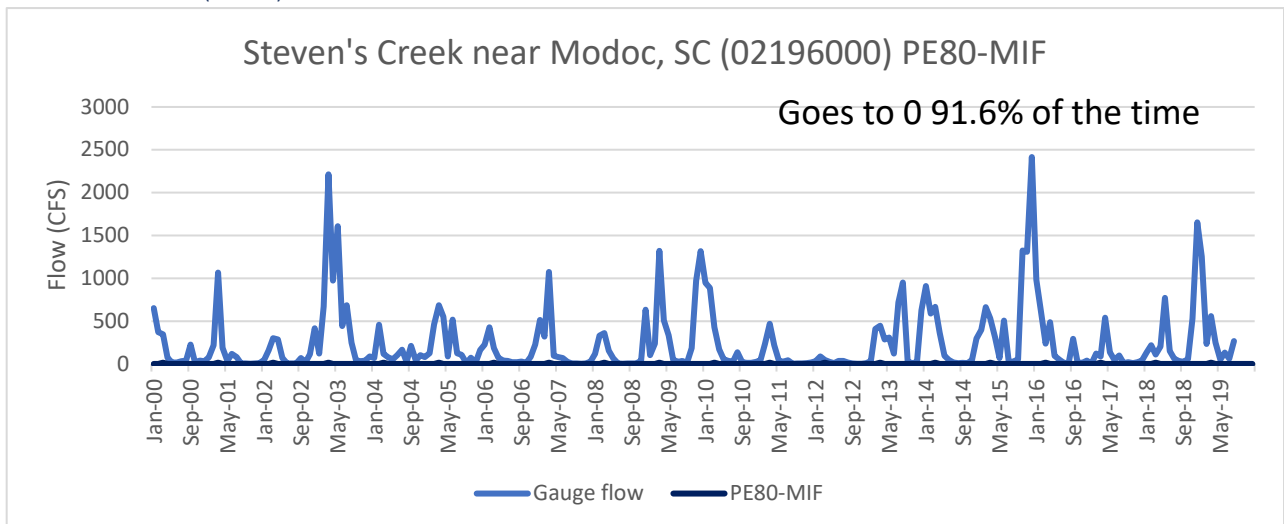


10th Percentile (PE90) – MIF

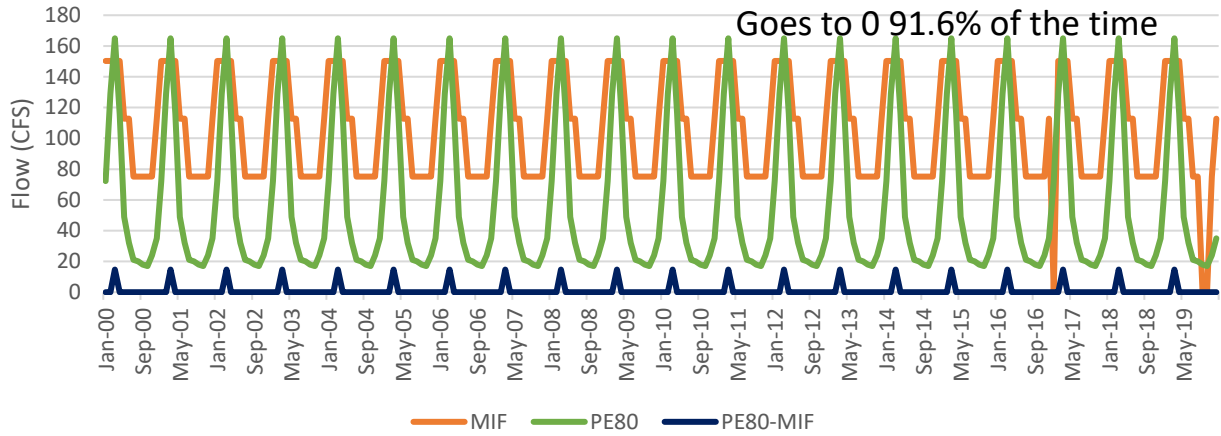




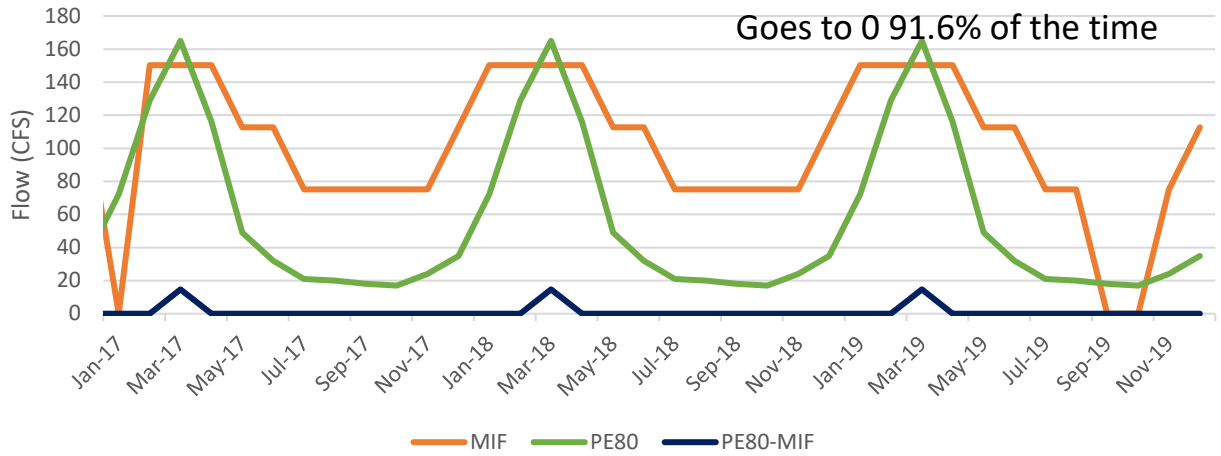
20th Percentile (PE80) – MIF



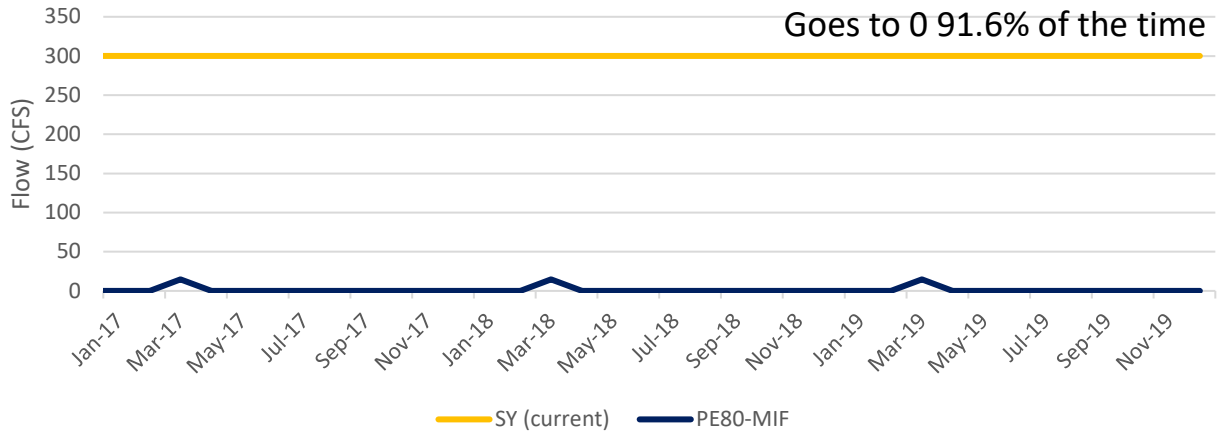
Steven's Creek near Modoc, SC (02196000) PE80-MIF



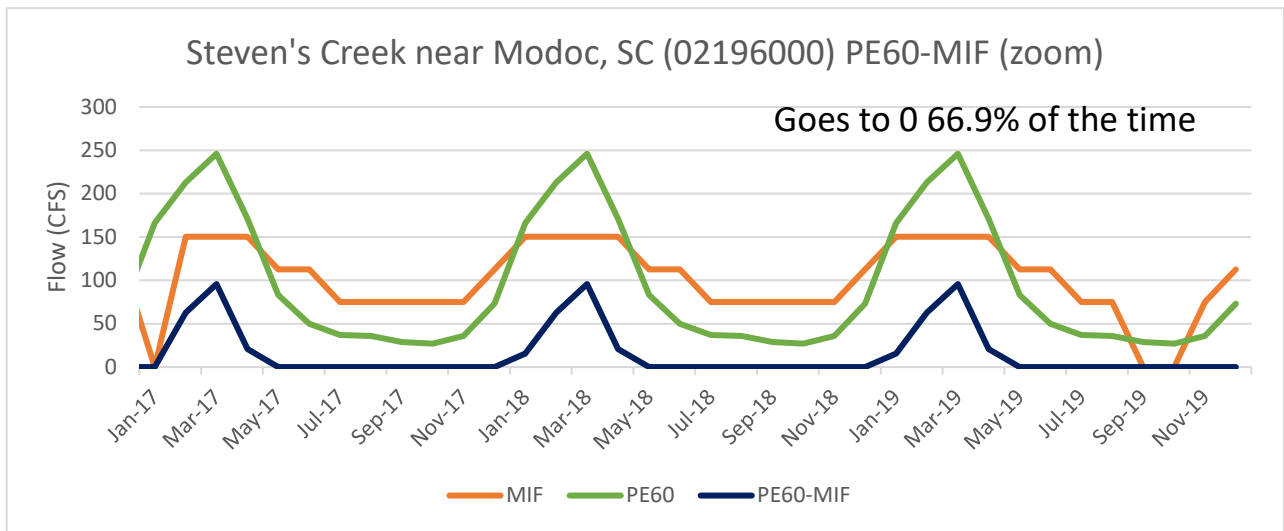
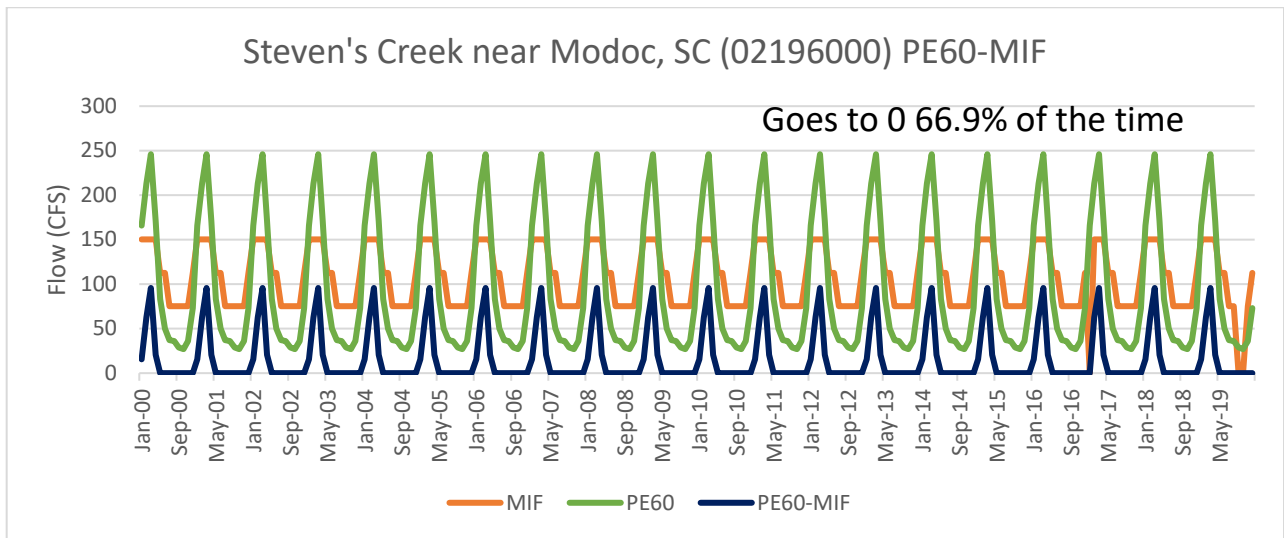
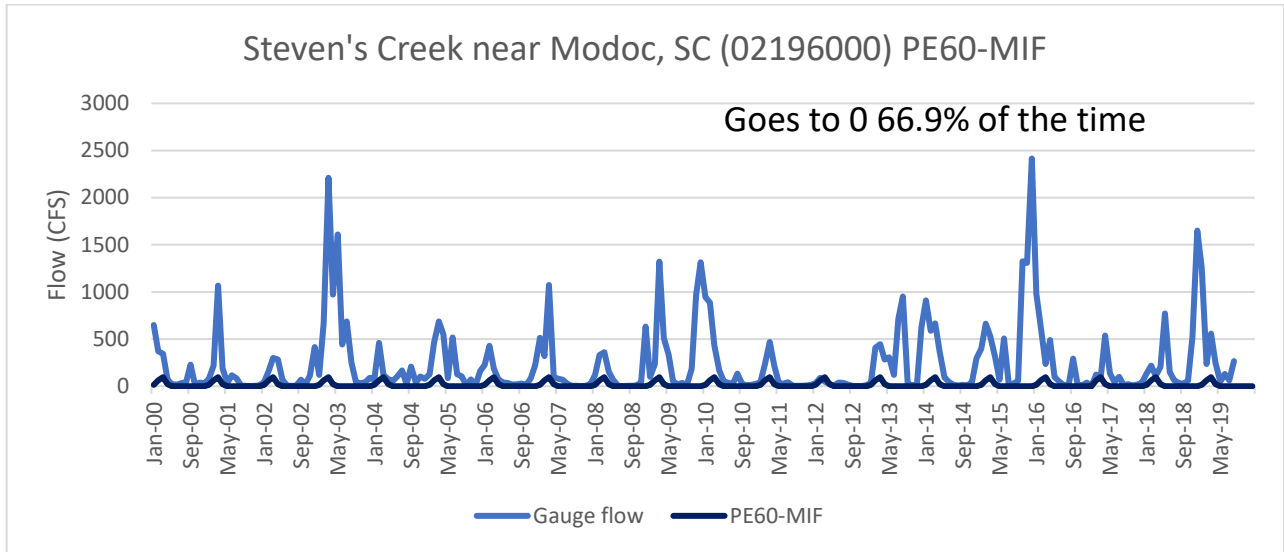
Steven's Creek near Modoc, SC (02196000) PE80-MIF (zoom)

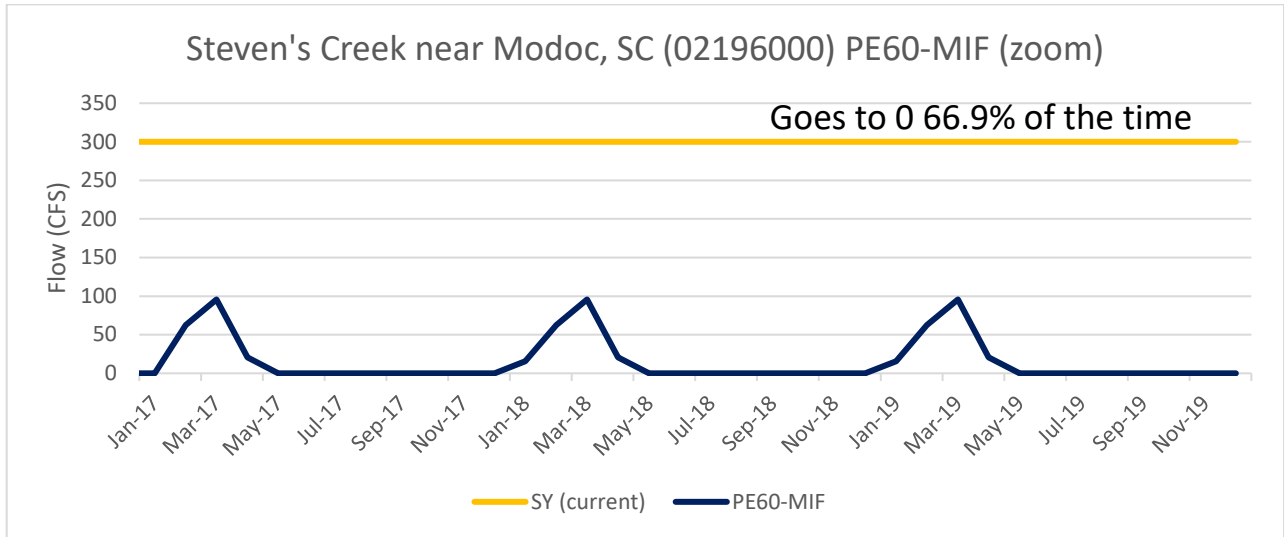


Steven's Creek near Modoc, SC (02196000) PE80-MIF (zoom)

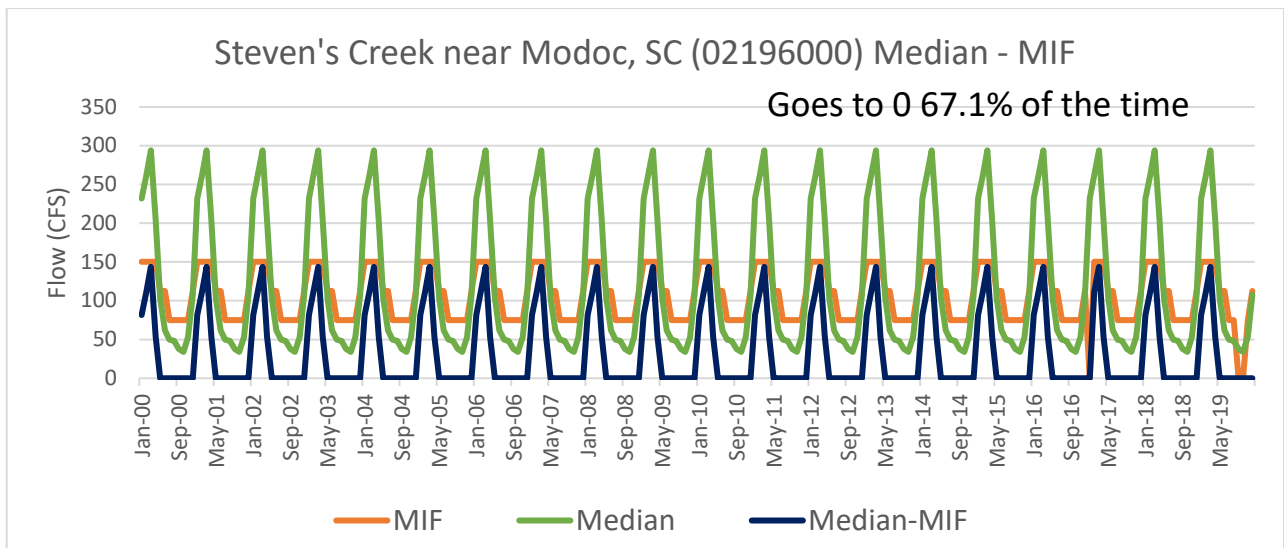
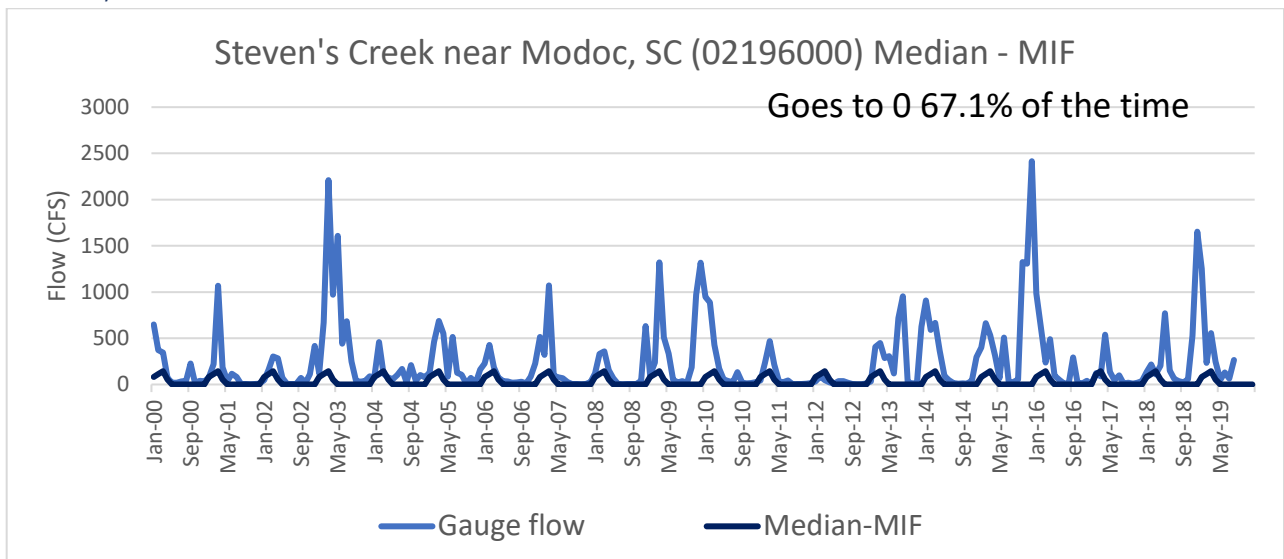


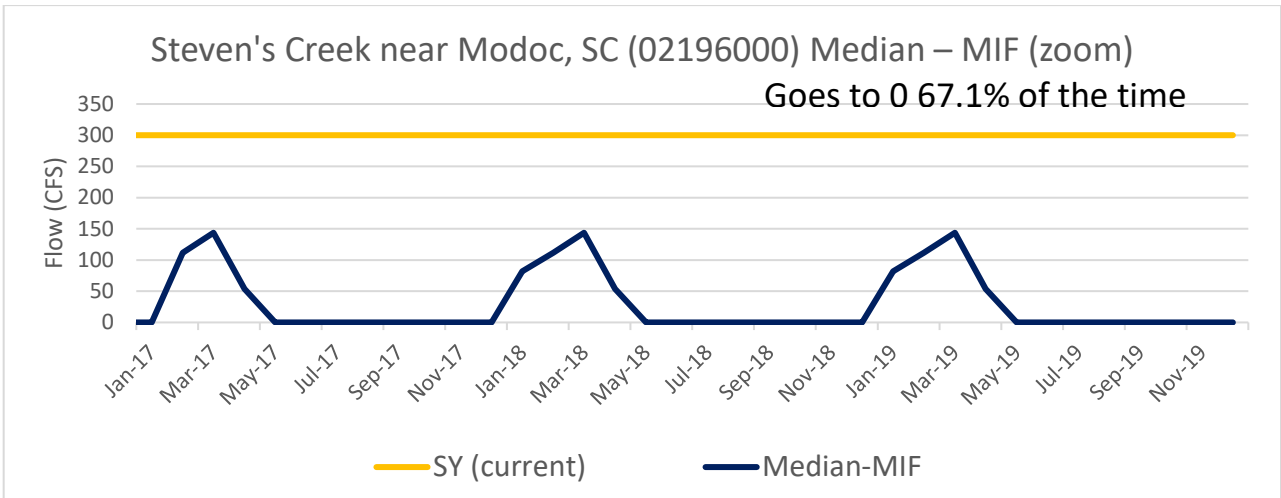
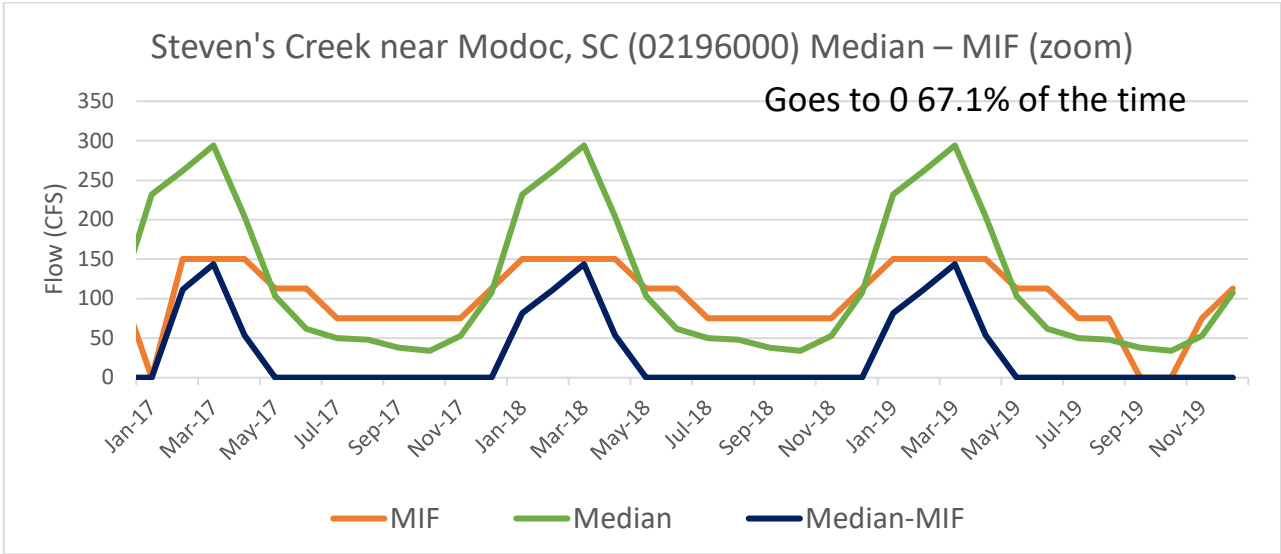
40th Percentile (PE60) – MIF



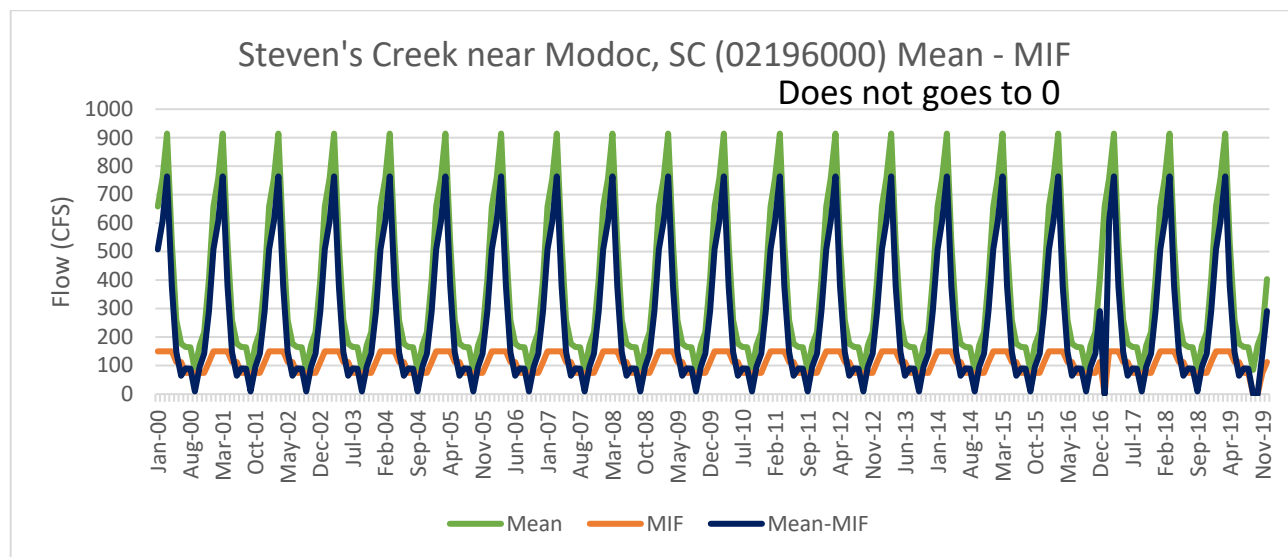
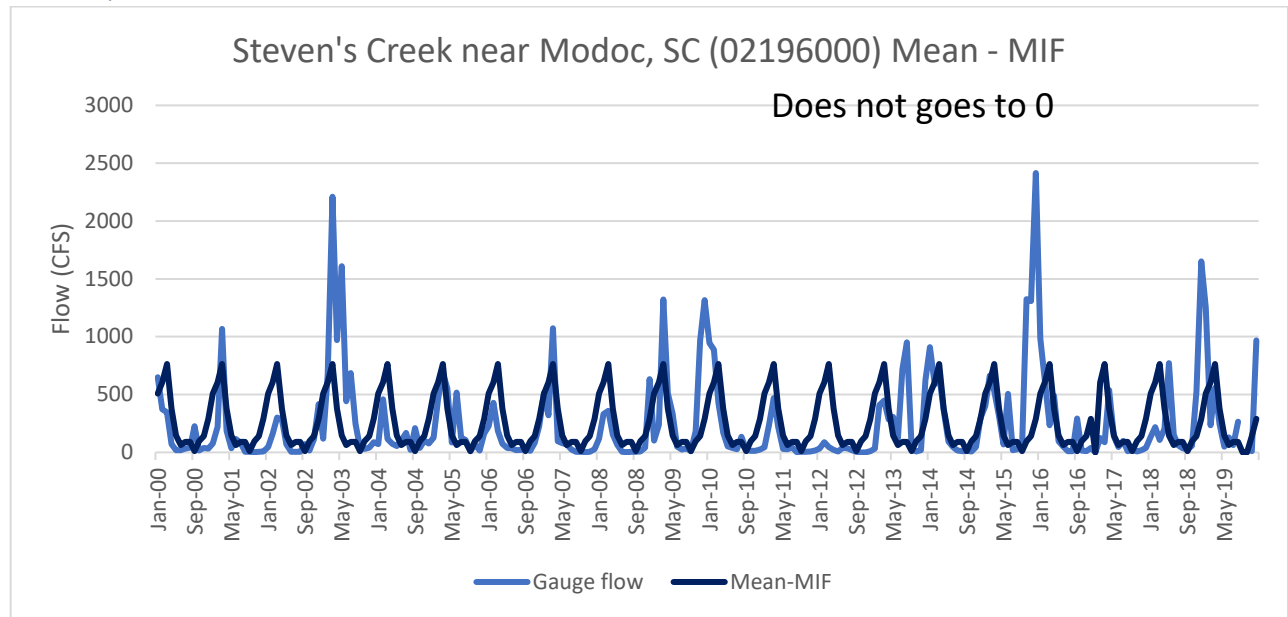


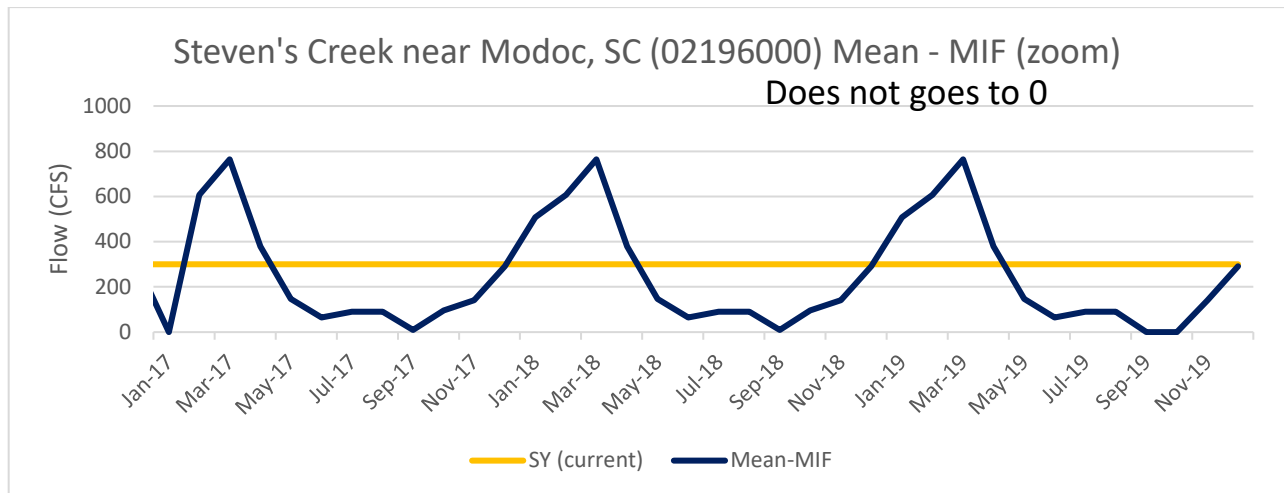
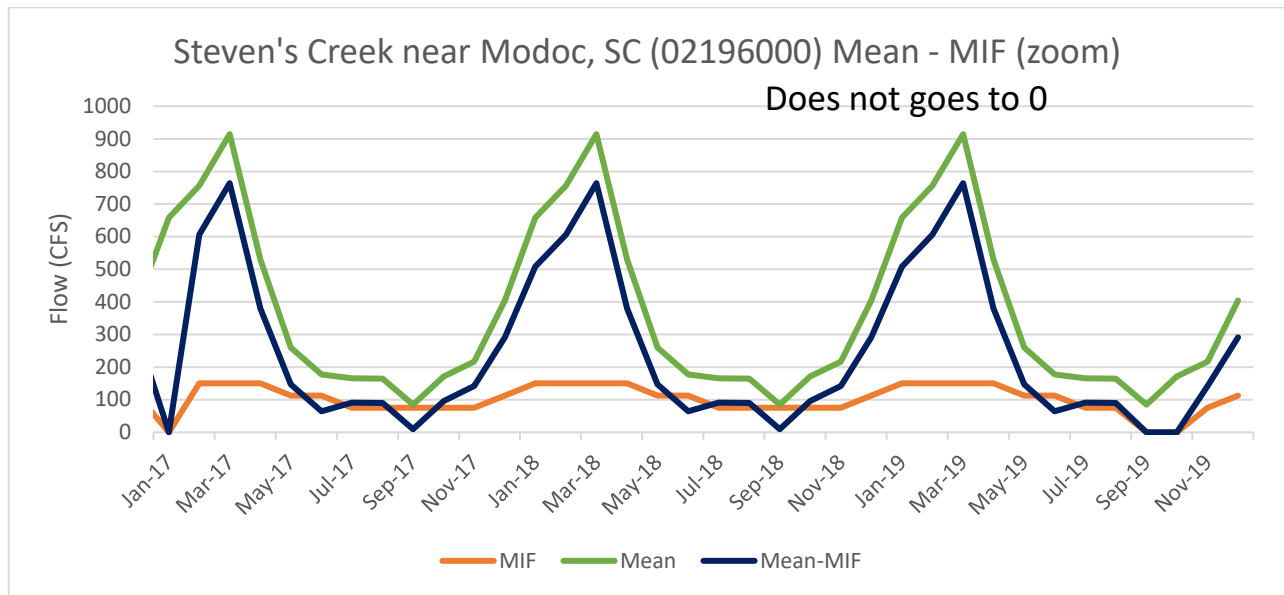
Monthly Median – MIF





Monthly Mean – MIF





Appendix C

Email to Surface Water Safe Yield Stakeholder Group:

All,

Thank you to those that were able to attend today's meeting. Attached are the slides that were presented. Draft Minutes will be sent out as soon as completed.

The 4th meeting of the SY work group is has been rescheduled for June 9th. Hopefully the extra time between meetings will allow for an in person meeting to occur. If we are still required to social distance at that time we will again use the MS Teams meeting platform (a link will be sent out closer to the meeting). We will also attempt to get a call-in line established for those that has issues with the audio on their computers.

As requested during the meeting the Department will be accepting written comments from the workgroup members. Comments can include but are not limited to:

- What you like /do not like about the process so far
- What you like /do not like about the existing Safe Yield Calculation
- What you like / do not like about the alternative SY calculations presented so far/
- Additional Safe Yield calculation / determination method you would like the Department to consider.

For organizations that have more than one representative attending the meetings please consolidate your written comments to one submission. Please submit comments and alternative calculation proposals by May 18th so that an agenda and work-plan for the 4th meeting can be developed.

Again thank you to everyone for their efforts keeping this process moving during these challenging times. I hope that you and your family are and continue to stay safe. Please let me know if you have any questions or concerns as we move forward.

-Alex

Email Replies

American Rivers:

Thanks Alex.

One of the great benefits we have at American Rivers is a sabbatical every 7 years. I'll be on sabbatical from May through the first half of July so this will likely be my last safe yield workgroup meeting. I really appreciate that you and BOW are being responsive to the call for improvement to the safe yield calculation and doing what you can within the law. That said, it doesn't appear there can be substantial improvement. I am cautious about going forward with any regulatory change that would provide only minor improvements because once at the Legislature it could result in unintended consequences.

Best regards,

Gerrit

Santee Cooper:

Alex,

Thanks for the meeting and slide deck. Here are my thoughts:

- Again, I'd like to see the state's drought response system beefed up to resolve shortage concerns. I know it's not the Safe Yield group's intent to "fix" this, but that's where the rubber seems to meet the road in most of these discussions. To that end, I'm OK with an "available capacity" that differs slightly vs. the gauge data. I think that's preferable to having a lot of stream segments that have no available capacity at all. After all, it's not unreasonable that users come up with their own ways to mitigate against risk of low water levels at their intakes.
- If we were to develop a differential program (small streams vs. big streams, etc), what would it look like? Based on ecoregion, the size of the watershed (digits in HUC codes?), something else, or some combination? I think this is worth exploring because most major users are/will be on big bodies of water, features which are somewhat "self averaging," and for which the current regulatory regime may be sufficient, even apart from grandfathering. This could still allow for better approximation of flow rates/available capacity for smaller streams.
- I agree with the comment that it's premature to generate a report or conclusions regarding a regulatory change at this time, and that it would be preferable to refrain from doing so until after we can meet in person again. I'm very comfortable reviewing the alternatives you all generate online, though, and would like to

continue to do so as we try to evaluate potential improvements and generate consensus around them.

- It would be helpful to generate tables comparing Gauge Flow, Current Safe Yield, MIF, and the Modeled Capacity for each regulatory alternative and each location. Maybe this could be done on some sort of average seasonal basis? I find it difficult to evaluate the myriad charts on my laptop, especially when some alternatives work well on large streams but poorly on smaller ones.
- I'd also like to see more evaluation of prospective current overallocation based on differing proposed regulatory regimes.
- In some respects, MIF-Median is an appealing basis for a metric. On the other hand, as MIF is defined legally vs. physically, a great deal of "error" is introduced to the modeled capacity figure by definition. This is just an observation that troubles me, as I don't have a solution given the terms of the statute or an idea of "what would be better" anyway. To attempt to resolve this into a question for you all to consider: I wasn't involved with the work that went into the statute, so were actual regressions ever done using variables that plausibly contribute to flow? It seems possible to me, but I haven't tried myself. In that event, is there a better term for the purposes of curve fitting than MIF? It seems like there should be. If so, I'd like to see regression-based models and statistics to better evaluate regulatory alternatives for curve fitting for some representative streams.

I know I've asked for a lot here - I'm just struggling to evaluate the alternatives for what's really an improvement to the regulation, and it doesn't seem like we've yet been able to identify a single change that is a universal improvement across all streams. If you guys think you have, it's probably worth spending some time talking about that preferred alternative a little more.

Thanks Alex - stay safe!

Jesse

Citizen/Edisto Engineers and Surveyors, Inc.:

Alex-

I would like to express my sincere appreciation for DHEC's effort to bring this forward. There is no misconception of how difficult it is to actually do your job and keep it at the same time.

I purposefully have not submitted proposed solutions. In my opinion, there really are none until ALL users are held to the same basic standard of ensuring minimum instream flow is preserved. It is my hope that this exercise will highlight the statutory deficiencies

preventing meaningful management, oversight, and ultimately protection of the free-flowing surface waters that a broad array of existing users depend upon.

In response to your request for written comments, I do not know of anything that that you could have done differently that would improve the meeting process. The fact that DHEC is finally able to acknowledge the issue is a huge step forward. Participation in the meetings also suggests that others recognize a problem. Unfortunately, as is typical in South Carolina, it will likely take a real time issue to move the ball. Crisis management seems to be the preferred method for addressing even the most practical of matters.

For the next meeting I would like to request an analysis on the Salkehatchie Basin to see how the proposed methods could affect the documented drawdowns to zero that basin periodically experiences. This of course would assume the proposed method could be applied to existing users to make any difference.

Thank you for the opportunity to be involved.

J.J. Jowers
Bamberg, SC

Clemson:
Jeff Allen

I applaud SCDHEC for making the effort to address issues of concern of many different water user groups around the method of determining safe yield for rivers, streams and reservoirs across South Carolina. The process of these safe yield meetings has been informative and fair, providing plenty of opportunity for input and feedback. Some people have brought up the concern that if a new safe yield formula only applies to new permits and registrants (4-5% of withdrawers) then there is no point in putting together the effort. I understand the concern, but I feel at the very least we need to have these discussions, and more importantly, we can be building the foundation for changes we all deem critical for the future conservation of waters of South Carolina

Of the alternatives discussed, it appears that using the "median monthly - minimum instream" formula allows some added flexibility without over prescribing beyond the current safe yield and without going below minimum instream flow in most cases.

I thought Jesse Cannon and others brought up some good points about potentially adjusting SY as you move closer to the headwaters of a stream network. As was noted, the mainstem streams tend to have plenty of volume at almost all times to handle the number of withdrawals on them. It's the headwater streams that potentially would undergo the most stress by added withdrawers. Perhaps a solution (and I do not know what the formula would be) would involve a more restrictive safe yield formula as you move from 1st, 2nd and

3rd order streams on up until you get to mainstem streams and that highest order having the least restrictive formula – maybe three different categories of stream order?

I am torn a bit by wanting to wait until the river basin councils proceed with basin planning efforts and let them make individual (perhaps different) safe yield recommendations for each of the eight river basins. However, by waiting this could mean more new withdrawers potentially rush in to get registered under current safe yield rules thinking they may be less restrictive than what the RBC's recommend. So, assuming that certain RBC's will desire changes to the safe yield formula for their specific basin, some new rules for safe yield may be better than no changes at all

SC Department of Natural Resources:

Technical Memorandum – SYWG-01

Date: 5/14/2020

From: Scott Harder, Hydrology Section Chief, South Carolina Department of Natural Resources

To: Alex Butler, South Carolina Department of Health and Environmental Control

Re: Comments on the regulatory safe yield definition and associated Safe Yield Working Group

Though we appreciated the opportunity to participate in the Safe Yield Working Group to discuss potential alternative methods for the regulatory safe yield definition, the Hydrology Section of the South Carolina Department of Natural Resources will not make any formal recommendations to change the safe yield definition at this time for the following reasons:

1. SCDNR's position on the regulatory safe yield definition (and the Surface Water Withdrawal, Permitting, Use and Reporting Act in general) over the past several years has been to rely on the new state and river basin planning process to address any issues or provide recommended changes to existing water legislation and associated regulations. This position has been consistently communicated to stakeholders over the past several years and SCDNR's position remains unchanged. SCDNR also believes that this the position was a joint understanding between SCDNR and SCDHEC so the initiation and timing of this series of safe yield meetings came as a surprise to our agency especially since Edisto river basin planning activities are now underway.

2. A major effort is currently underway by The Nature Conservancy and Clemson University to develop biological flow standards for the state of South Carolina. Specifically, this effort

is attempting to assess the impacts of hydrologic flow alteration on fish and other aquatic species. This effort is likely the largest and most complete study regarding aquatic habit ever completed in the state, and the results of the study have great potential to inform or guide any future changes to the regulatory safe yield definition. Several members of the Safe Yield Working Group have noted the need for sound science to inform changes to the Safe Yield definition and, though results of the study are still at least a year away, SCDNR strongly believes it will be worthwhile to wait on the results of this study before committing to or supporting any changes to the regulatory safe yield definition.

Other Comments

1. There was some discussion during several of the safe yield meetings regarding whether a one size fits all approach works for all parts of the state when defining regulatory safe yield. After further reflection, SCDNR contends that it will depend on the type of metric used to compute the regulatory safe yield. Percentile based methods and metrics such as the 7Q10 could most likely be applied statewide. However, any metric defined as a fraction of an average (like the current regulatory safe yield definition) would not be appropriate because of the high degree of variability in baseflow and runoff characteristics from subbasin to subbasin that lead to notable differences in the shapes of flow duration curves.

2. The regulatory safe yield and minimum instream flow are estimated using gauged streamflow, and over time significant withdrawals or discharges can cause bias - the estimates will be artificially reduced by withdrawals and inflated by discharges. One possible solution to this

problem is to calculate regulatory safe yield and minimum instream flow using unimpaired flows (UIFs). This appears to be allowable within the current Act and Regulations. UIFs are already calculated for most relevant gauges and can be updated annually as water-use data becomes available. Though this topic was briefly discussed at one of the stakeholder meetings, the topic was not thoroughly vetted but deserves more attention in the future when considering changes to the Act or its regulations.

3. The current regulations do not appear to protect existing registered use from new registered withdrawals upstream. Right now, it is unclear if there is any regulatory process to resolve a water availability dispute between two registrants. A prescribed regulatory process could help protect existing registered users. One potential approach for consideration as a regulatory change is to define the minimum instream flow for new registrations as the flow needed to meet registered downstream uses (accounting for natural replenishment). Future discussion regarding modifications to the Act and associated regulations should include ways to avoid potential water disputes between upstream and downstream users

The South Carolina Farm Bureau

The South Carolina Farm Bureau appreciates the opportunity to participate in the Safe Yield Workgroup during the Spring of 2020. The Farm Bureau is a statewide organization that brings together farmers, ranchers, entrepreneurs, agribusiness professionals and food enthusiasts to strengthen the future of agriculture in South Carolina. We represent an important stakeholder on water use issues in South Carolina.

It was DHEC's stated purpose to meet with stakeholders to: Evaluate how safe yield is currently calculated and to examine possible alternative calculations that the Department should consider

This began as a narrow scope of review, though the stakeholders have wandered from this narrow scope to a broader discussion of the entire surface water regulatory program. There have been several assumptions about how the program runs, but those were not always consistent with the law, regulation and DHEC's implementation. To that end, this group discussion has raised the knowledge of the broader program, which has been good. The reality is that the regulatory definition of safe yield has a narrow effect on the broader program.

After several meetings, DHEC appears to be prepared to wrap up the stakeholder input process and prior to its last scheduled meeting, is soliciting comments from the group. While DHEC has set a date of June 9th for the final meeting, the Farm Bureau is concerned that this will be another "virtual" meeting versus an in-person meeting. Nonetheless, here are our substantive comments.

1. DHEC launched this stakeholder process having heard of undefined concerns about "safe yield" as it is codified in surface water withdrawal program, and yet there has been no documentation of any water withdrawal problems with the current program. It appears that some believed that changing the safe yield calculation is some type of remedy for a nonspecific shortcoming. Even during the three meetings DHEC has hosted, neither DHEC staff nor stakeholders have identified any tangible problems with the safe yield definition and its implementation. In fact, DHEC presented information at the outset that only one small stream segment was fully allocated. At the last meeting, DHEC also noted that two large registration requests had been received that might also fully allocate another stream segment. These examples seem to support the conclusion that the program, and definition of safe yield, as implemented, is working. On this basis, the Farm Bureau believes that no change is warranted, either statutory or regulatory. Both initially and to this date, the Farm Bureau has been concerned that DHEC was looking for a solution to a "problem" that does not exist. We observe that most concerns have been outside the scope of this workgroup. For example, some stakeholders hoped that changes would better address drought management issues – something this program was not designed to address. It was

designed to work in concert with the South Carolina Drought Response Act (S.C. Code Ann. §§ 49-23-10 et seq.).

2. In the initial meeting, DHEC stated that it did not want a change for change sake. Rather, DHEC made it clear that it would only consider a change that would be “better.” Being better was not defined, but apparently DHEC left the door open to a change in regulation that would continue to allow for a reasonable use and yet protect the current uses of surface waters.

With this in mind, DHEC sought ideas on alternatives to the current safe yield definition – an approach that would fit within the current statutory framework (i.e., a change that would require only a change to the regulation that would be consistent with the law).

Initially, DHEC did not receive any specific alternatives and pondered on its own initiative other approaches. At the April meeting, DHEC discussed one alternative approach, but its originator is not clear.

While it is easy to redefine “safe yield” in terms of math (i.e., from what to subtract the minimum instream flow), to date there have been only different methods and not any better methods provided. On this basis, the Farm Bureau requests that DHEC conclude that no change to the regulation is justified at that time.

3. Finally, we provide an observation: The concerns we heard were not focused on the definition of safe yield, but rather broader concerns about the program that are policy issues developed during the construction of the current statute. The fact that many people might have preferred a different statutory construction should not distract from the reality that the current program and the current definition of safe yield is working well. Some legal challenges to the program have been made unsuccessfully about the program at large. A change to the safe yield definition should not be used as a tool to address broad policy changes which can only be done by the SC Legislature.

These types of stakeholder meetings are important and the Farm Bureau is glad to be a part of them. Thank you for the time DHEC staff has set aside to discuss and analyze this issue. However, there is no need to make regulatory changes without any well-defined problem and without a result that we know will be good for all of South Carolina’s stakeholders. As you know, any change to a regulation will likely have unintended consequences because it is hard to anticipate all of the pitfalls. This is not the time to adventure into the unknown, especially in the face of unanticipated impacts of the current coronavirus situation.

A final thought for DHEC: the staff in the surface water program has been patient with the stakeholder group and have shown a mastery of the law and regulation for which they should be commended. Thank you again for the opportunity to participate and to submit these comments.



South Carolina Farm Bureau Federation
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www.scfb.org

DHEC'S SAFE YIELD WORKGROUP
Wrap-up Comments
June 16, 2020

As the workgroup held its final meeting on June 9, 2020, the South Carolina Farm Bureau appreciates the opportunity to participate along with other stakeholders. The Farm Bureau is a statewide organization that brings together farmers, ranchers, entrepreneurs, agribusiness professionals and food enthusiasts to strengthen the future of agriculture in South Carolina. We represent an important stakeholder on water use issues in South Carolina.

We appreciate DHEC offering this week to provide final comments. Please accept this as a supplement to our comments dated May 15, 2020.

As Water Program Chief Mike Marcus summarized in closing out the workgroup, many aspects of the Surface Water Permitting Program were discussed, the final summary and subsequent report will narrowly focus on the Safe Yield definition as detailed in Regulation 61-119. While the Farm Bureau has not heard of any need to change the Safe Yield definition, we appreciate DHEC staying focused on this one issue.

It is important to note that this process generated no consensus that a change is needed, much less a particular alternative recommended by the group. While DHEC generated most of the alternatives to spur discussion, at our last meeting no attention was given by the members at to a particular need or a particular alternative definition.

In summary, we have benefitted from this process and the dialog has been helpful for all stakeholders it appears. We appreciate the sentiment by DHEC staff that it has no interest in change for change sake, especially without a well-defined problem and without assessing the impact of any given proposed change. We trust that DHEC has no plans for changing R.61-119 at this time and look forward to DHEC's final report.

Safe Yield Workgroup Feedback Form

Responses: 10 Average time to complete: 37:33

Status: Closed

1. To what extent do you feel the "Monthly 10th Percentile Flows - MIF" formula would change the way safe yield is currently calculated?

● Better	0
● No difference	5
● Worse	5



2. To what extent do you feel the "Monthly 20th Percentile Flows - MIF" formula would change the way safe yield is currently calculated?

● Better	0
● No Difference	5
● Worse	5



3. To what extent do you feel the "Monthly 25th Percentile Flows - MIF" formula would change the way safe yield is currently calculated?

● Better	0
● No Difference	5





Worse

5

4. To what extent do you feel the "Monthly 40th Percentile Flows - MIF" formula would change the way safe yield is currently calculated?

● Better	1
● No Difference	5
● Worse	4



5. To what extent do you feel the "Monthly Median - MIF" formula would change the way safe yield is currently calculated?

● Better	3
● No Difference	4
● Worse	3



6. To what extent do you feel the "Monthly Mean - MIF" formula would change the way safe yield is currently calculated?

● Better	2
● No Difference	5
● Worse	3

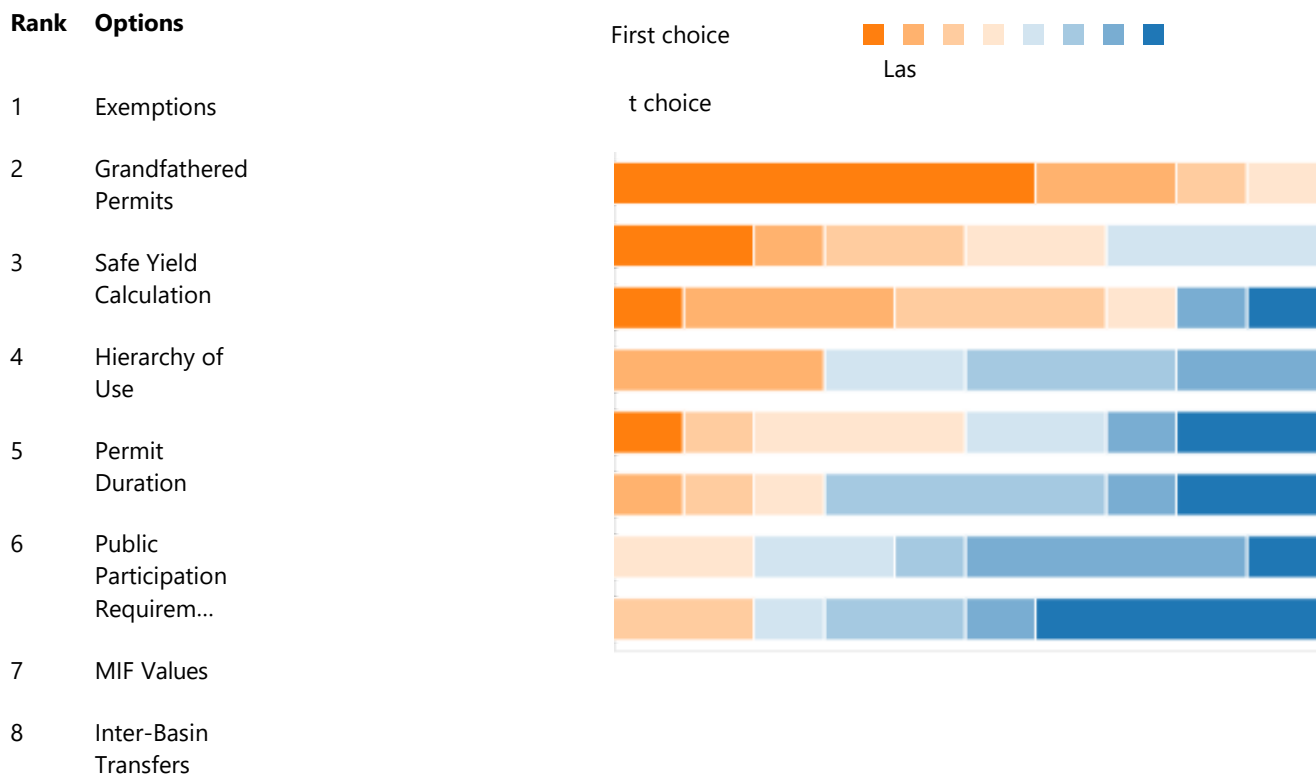


7. Is the way Safe Yield is currently calculated a concern to you regarding surface water withdrawal management?

● Yes	8
● No	2



8. Please rank your concerns with the Surface Water Withdrawal laws and regulations from the most to least concerning:



9. In the space below, please provide any anonymous feedback regarding the Safe Yield Workgroup, the Safe Yield Calculation, and any constructive feedback as to how the workgroup was conducted and any takeaways you may have had from this experience:

9 Responses Latest Responses

"Keeping the discussion going on safe yield (and other issues) and eng... "We ranked the alternatives "no difference" as we believe at this time ... "I've enjoyed learning about the rationale behind the regulatory definit..."

ID	Name	Responses
1	anonymous	I feel the state should wait until other working basin groups have completed their work before we proceed with any new recommendations. The problems/issues with water quantity have not been fully documented on a state-wide basis to warrant any changes at this point.
2	anonymous	This was a great demonstration of why calculations are meaningless when a major class of user is exempt from regulation. At an absolute minimum, ALL users should be held to an instream flow standard.
3	anonymous	The original law was never intended to guarantee that any stream segment would have water flowing in it all the time. The law was meant to allow some use of the water and during low flow periods, those withdrawing water should employ drought management practices until it rains again.
4	anonymous	After learning/confirming that A: Because of exemptions and grandfathered withdrawals less than 10% of withdrawers actually have to observe the "protective" measures found in the SWWA. and B: There is a disconnect between the "20% of mean flow must remain" in the enabling legislation vs the "80% of the mean flow can be withdrawn" in the regulation, so the putative "minimum instream flow" protection is essentially meaningless as applied. These two facts alone make me reluctantly conclude that merely tweaking the "Safe Yield" formula would not achieve the level of change needed to adequately correct the obvious deficiencies in the status quo. (For this reason I was unresponsive on the questions relating to the MIF variations evaluated. Since not answering at all wasn't allowed by the survey tool, I selected "no difference" for all, based on my understanding that whatever we might tweak will NEVER be extended to affect the vast majority of permits, or any existing registrations.) The exercise has been informative and enlightening, and is much appreciated, but I do not see a quick, easy, effective remedy to the problems that concern me embodied in the information that has been developed thus far.
5	anonymous	I don't feel comfortable answering first 6 questions. Answering first 6 questions won't help. Asking the right questions and then looking for answers is better way. I know you guys have tried to help to the extent you can. I'll say what terrifies many: bad policy, bad law, need to lay ground work (use real basin stakeholder groups & not just usual suspects) to change law. PPAC may be best avenue to do this. Safe yield as defined or determined by SC regulators, while with the best of intentions, is dictated by Gen Assembly decision (law) which in essence attempts to make water demands, stream flows and water supply a political decision rather than a science/engineering decision with real and historical evidence that should drive science. That said, we live in a political world. Surface Water Withdrawal Permitting law was simply bad policy. Until bad policy is replaced with good science, nothing else really matters. When multi-decade droughts occur (and they

ID	Name	Responses
		<p>have repeatedly occurred), mega drought won't care about politics or law. Get back to basics. How much statistical safe yield do we have in each basin (segmented and not based a simple model)? What are segmented basin demands over next 100 years? What is the gap? What do we do about it (conservation, IBT, new supplies...)?</p>
6	anonymous	<p>I did not complete question 8. I strenuously object to this questionnaire. This reduces the entire stakeholder process to a vote on multiple choice questions and prioritizing topics not discussed. It now appears that with a single anonymous alternative proposed, the Department took it upon itself to develop other potential alternatives. The Department presented information that only one stream segment (<3 mi.) in the entire State was fully allocated; thus, no substantial justification for regulatory changes was presented.</p>
7	anonymous	<p>I've enjoyed learning about the rationale behind the regulatory definitions. I'm not convinced we have an actual problem at the moment, but it seems reasonable to expect that adjustments will be necessary over time to develop a program that delivers for all stakeholders. For small streams, I like the SY definitions that best match the MIF data, which in my estimation, are the (40th percentile - MIF) and (Median - MIF) scenarios. I believe it will be logical to come up with a different definition (or maintain the current definition) for larger streams and would urge the Department to do so. I appreciate the Department's efforts to address a difficult question. I'd close by noting a concern with "hogging" water that Scott Harder mentioned today - both those who do so in order to "reserve" the water, and those with intakes that are generally oversized. That's probably my biggest concern at this point, beyond the concerns noted in part 8 (this one wasn't available). I'm not sure how to develop a regulatory solution given the costs involved with developing new intakes, but it seems to me that withdrawal permits could possibly be done on an "estimated average" basis and on a maximum basis (which could perhaps consider hierarchy of need and require stronger contingency plans). I realize this would require a change to the statute, but it seems to me that realistic figures for both may be necessary to meet stakeholder goals - if not now, then as more stream segments become over-allocated.</p>
8	anonymous	<p>We ranked the alternatives "no difference" as we believe at this time a more evidence-based case is needed to support changes toward a more robust safe yield calculation. Any calculation proposed will require support from stakeholders in order to move successfully through the regulatory change process. We struggle to see how this support emerges without a body of evidence present in the debate. As a principle, safe yield should never allow a system to be drawn to zero flow. Stream health is clearly based in the movement of water; a matter of</p>

ID	Name	Responses
		<p>settled science. Several of the alternatives progress toward this goal. However, their primary justification to the user community will appear, at this time, to simply be "just leave more water". When the SY calculation takes stream flow to zero, "just leave more water" is justified, but to what extent? The question of how much to leave still remains and cannot be resolved by simply changing the math. We advocate for biologically-based approaches to answering the question of how much. There are discernible biological relationships between the amount of water in our streams and their health. These relationships should be the basis for both minimum instream flow and safe yield. Using said relationships to divine appropriate regulatory benchmarks has been accomplished in other states. There is currently an effort underway to develop these relationships for South Carolina. We certainly cannot predict offhand how these relationships would materialize for SC streams. However, likely general outcomes based on other US experiences include 1) regulatory targets calibrated to ecoregion and stream type, and 2) discovering that biological limits to withdrawal are set in key periods of time or season rather than perpetual year-long mathematical fixtures. The latter may, at once, produce new constraints and flexibility on water use. In any case, biologically-based standards assure stakeholders that regulatory limits are based in real and measurable consequences to stream health. In closing, we'd like to commend SCDHEC for opening and hosting this process. While improved SY approaches may not have been realized, some very important education on the reality of applying SC's Water Withdrawal Act to the ground emerged. This shared education among stakeholders can form a useful basis for finding better SY approaches, and perhaps improving other aspects of the Act over time. Thank you for the opportunity to participate.</p>
9	anonymous	<p>Keeping the discussion going on safe yield (and other issues) and engaging all user groups is critical to the success of water management and sustainable water use in South Carolina.</p>

Appendix D

Meeting Slide Decks Prepared by the Department for all 4 Safe Yield Workgroup Meetings are Attached in Sequential Order of the Meeting Dates