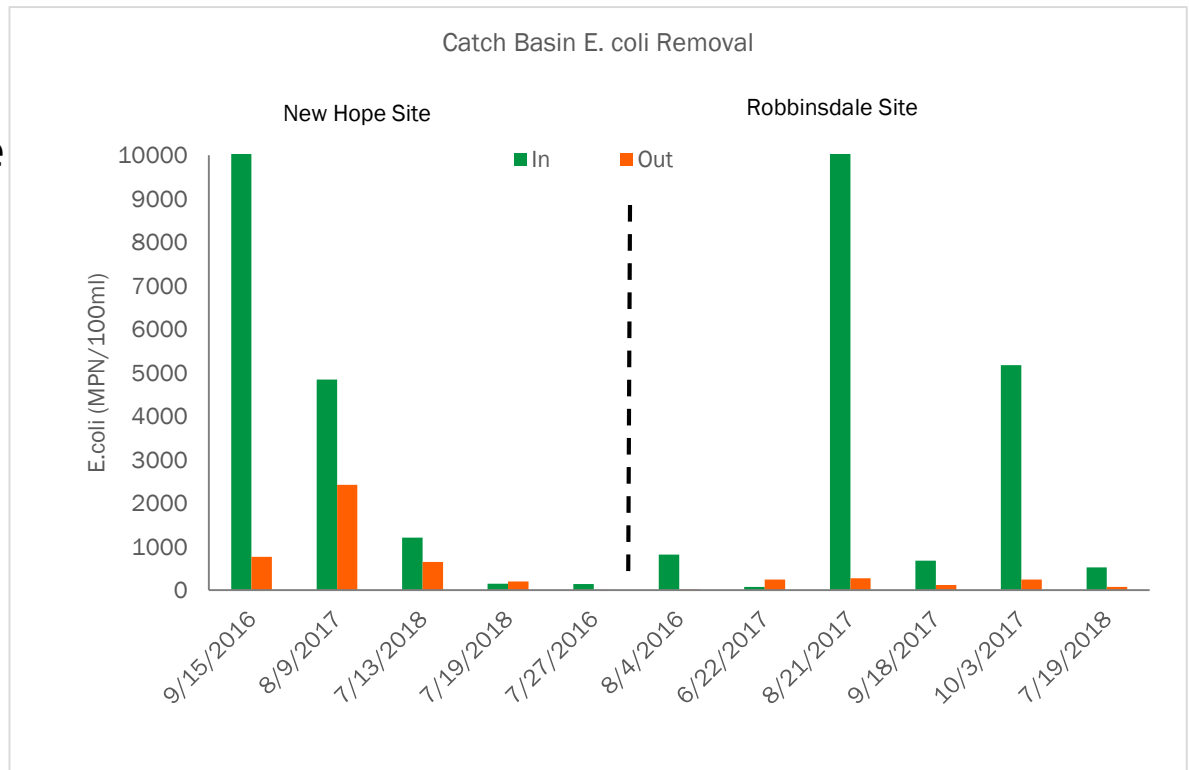


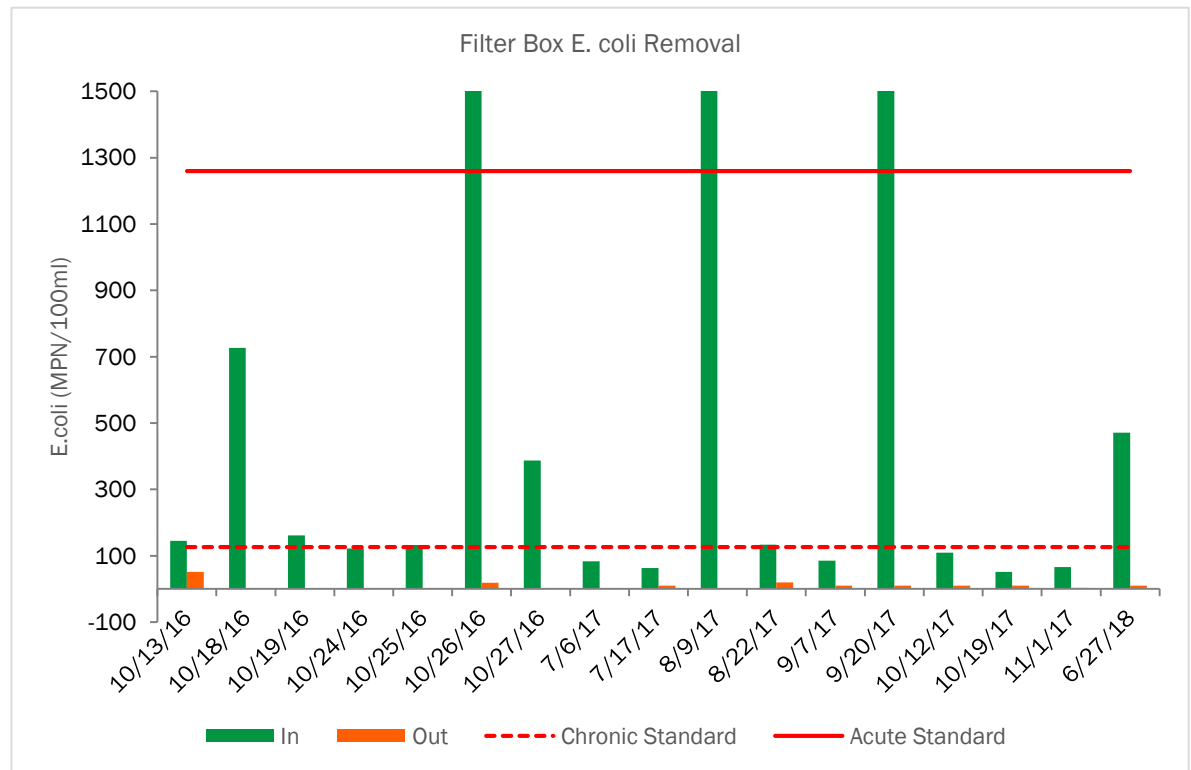
CATCH BASIN E.COLI REMOVAL

- New Hope average removal: 64%
- Robbinsdale average removal: 93% (one release event removed)



UTILITY BOX E.COLI REMOVAL

- Average removal:
93%

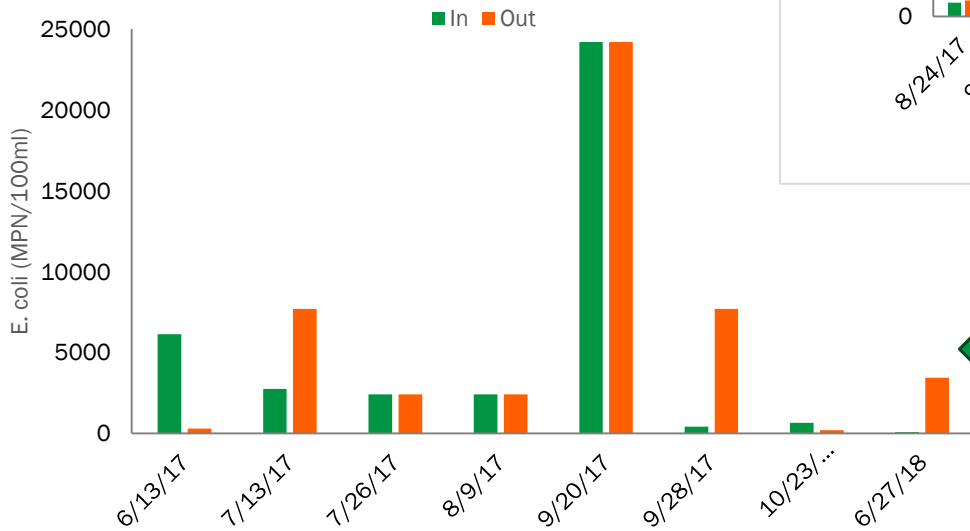


POND RETROFIT E.COLI REMOVAL

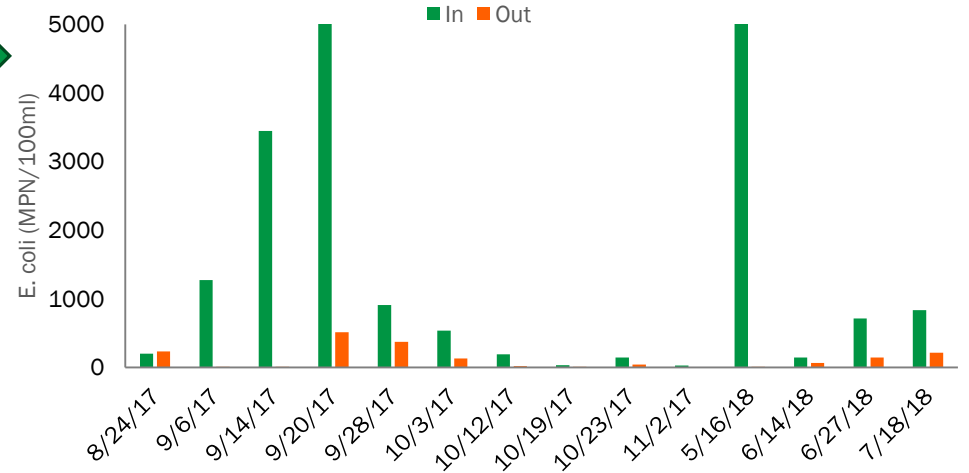
33% biochar in media

80% average removal
(one release event removed)

Crystal Pond E.coli Removal



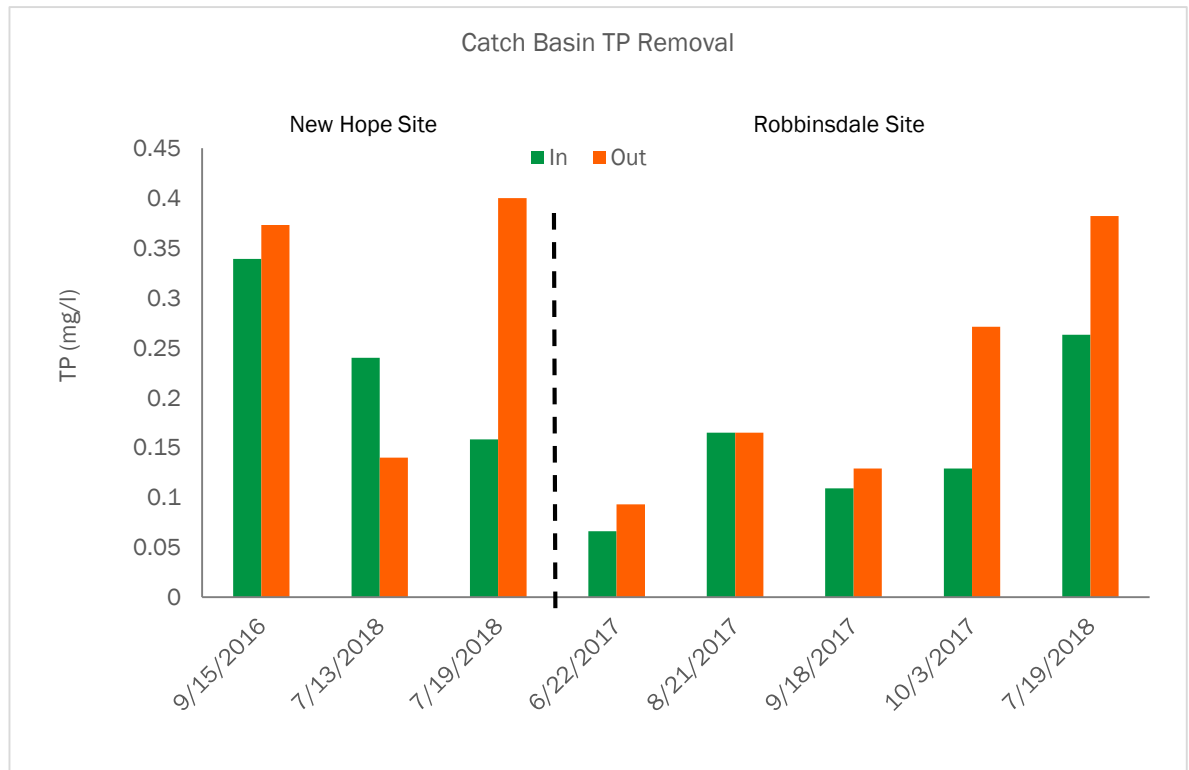
Champlin Pond E.coli Removal



0% biochar in media

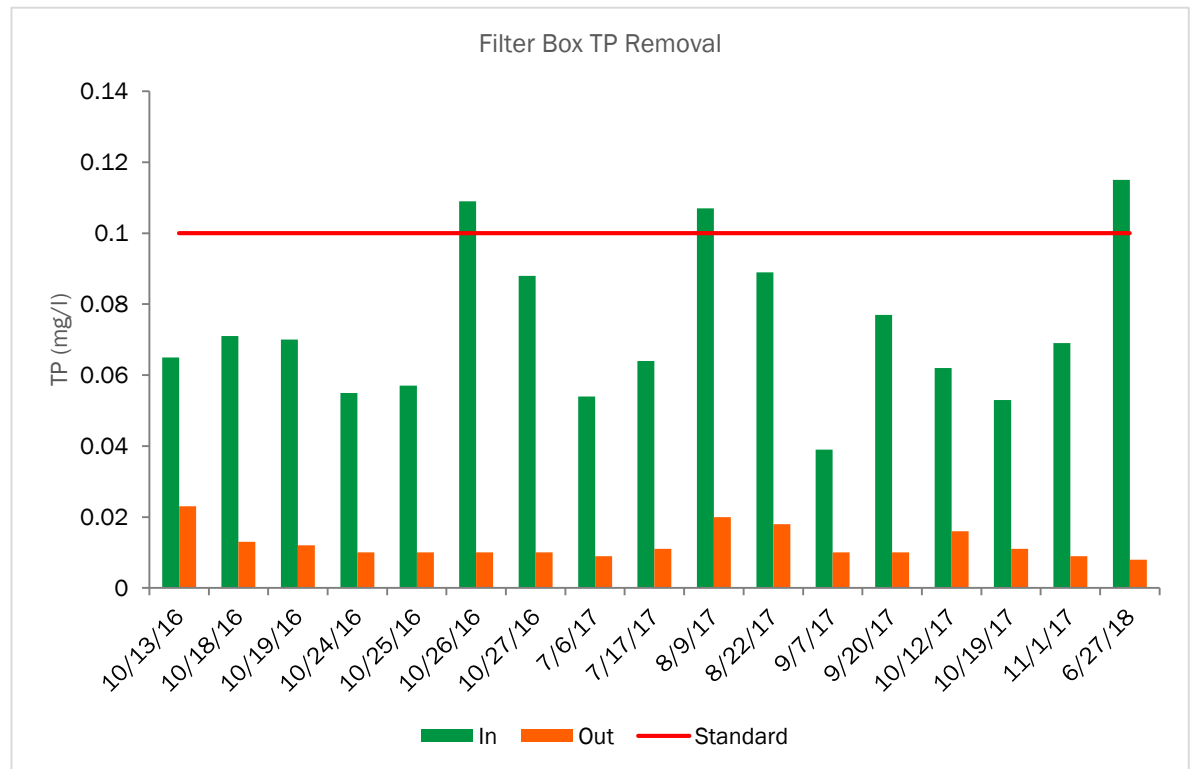
CATCH BASIN TP REMOVAL

- Catch basin retrofit is not very efficient in phosphorus removal



UTILITY BOX TP REMOVAL

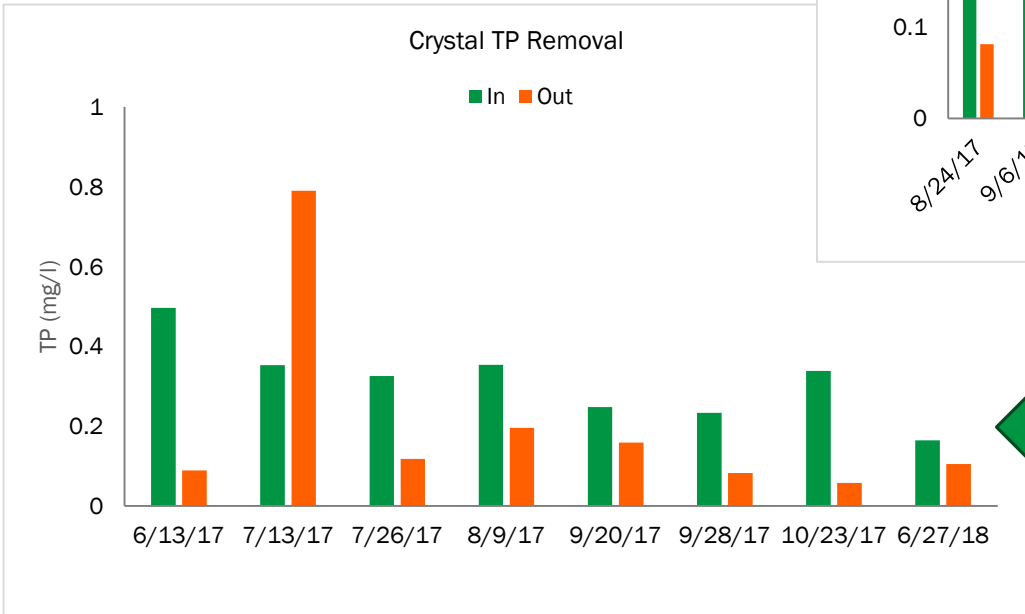
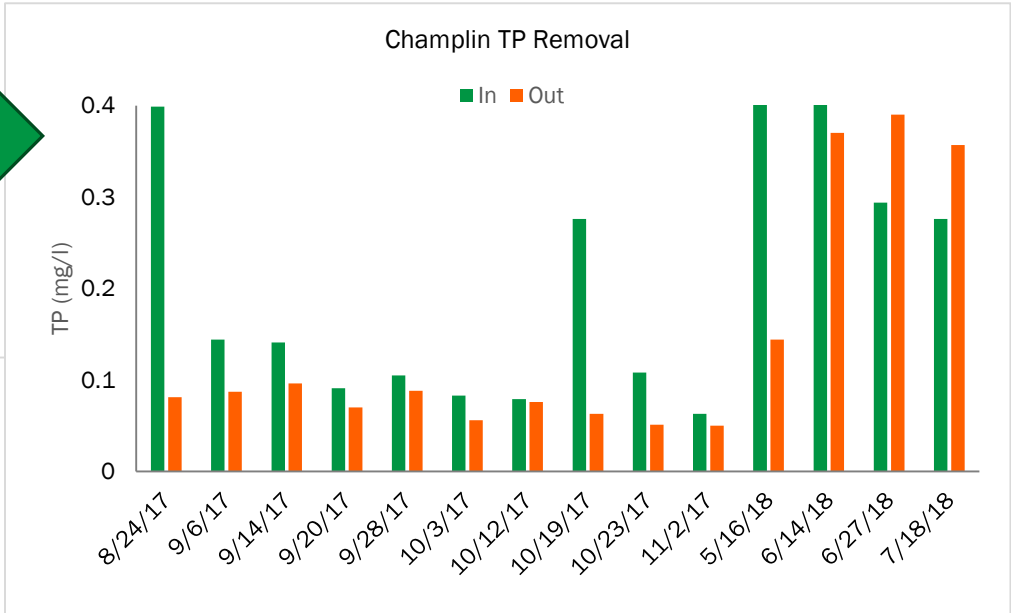
- Average removal:
82%



POND RETROFIT TP REMOVAL

33% biochar in media

39% average removal
(two release event removed)

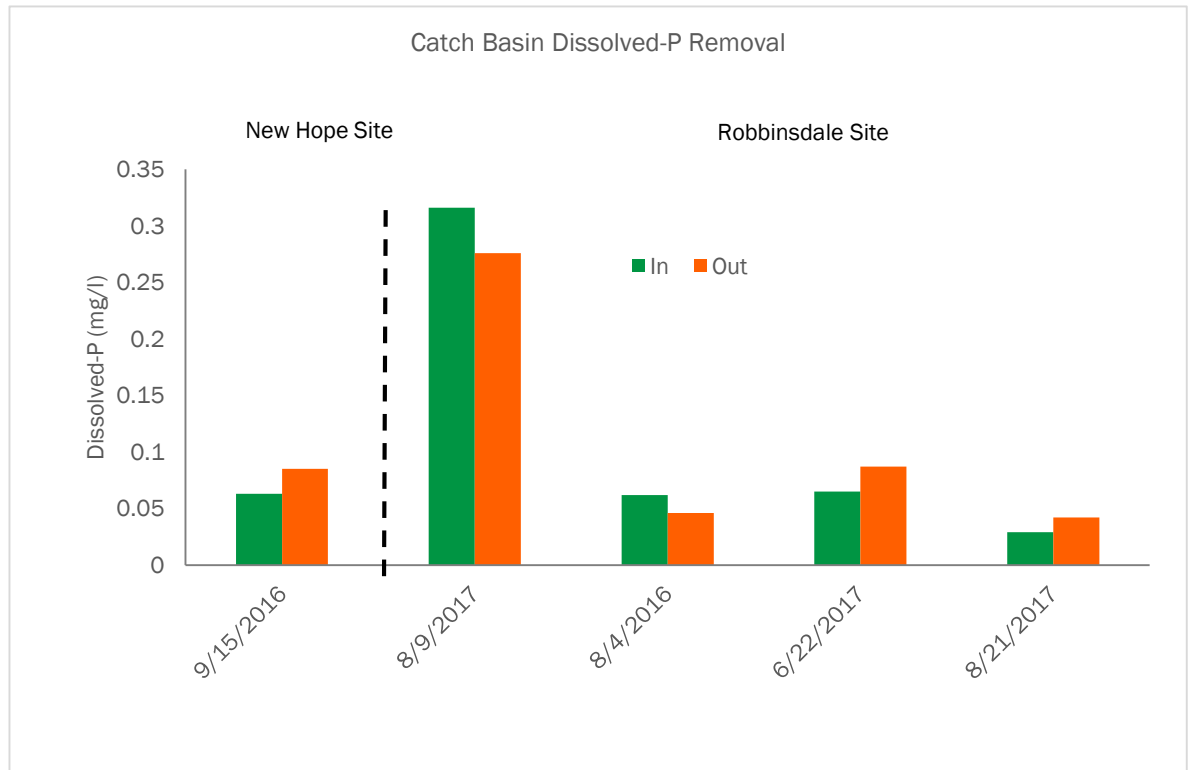


0% biochar in media

59% average removal
(one release event removed)

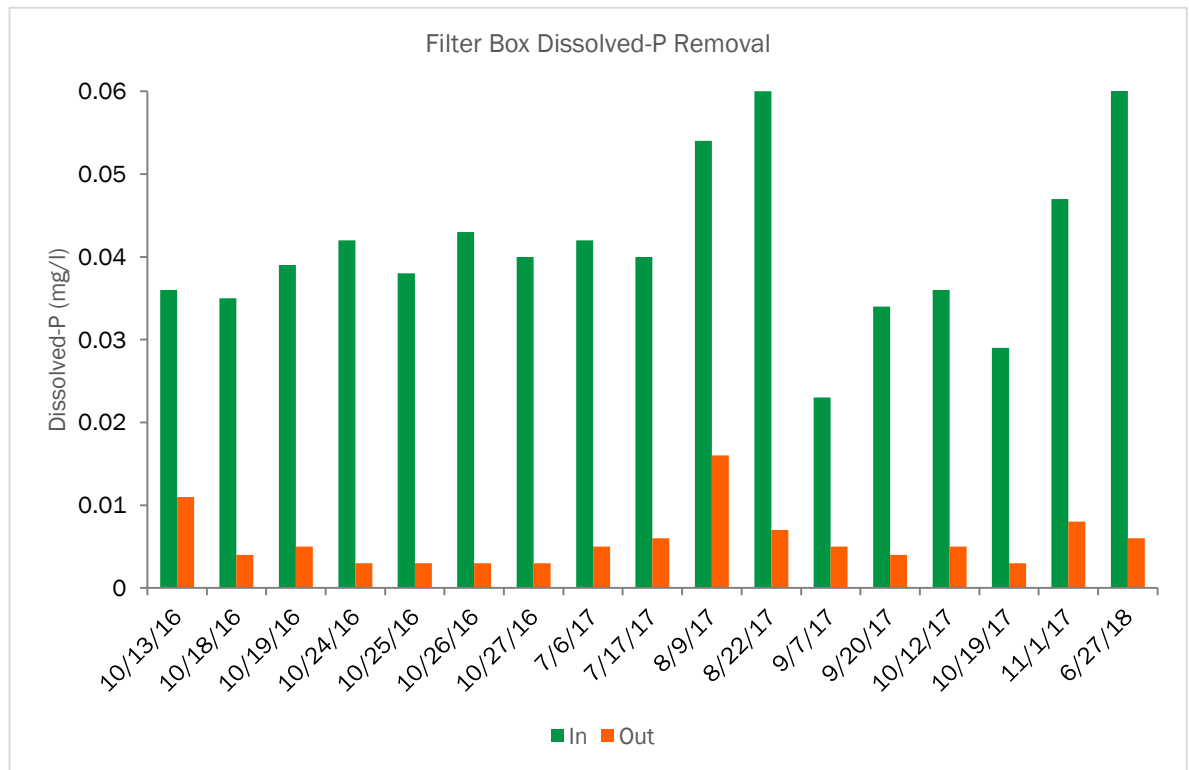
CATCH BASIN DISSOLVED-P REMOVAL

- Catch basin retrofit is not very efficient in phosphorus removal



UTILITY BOX DISSOLVED-P REMOVAL

- Average removal:
86%

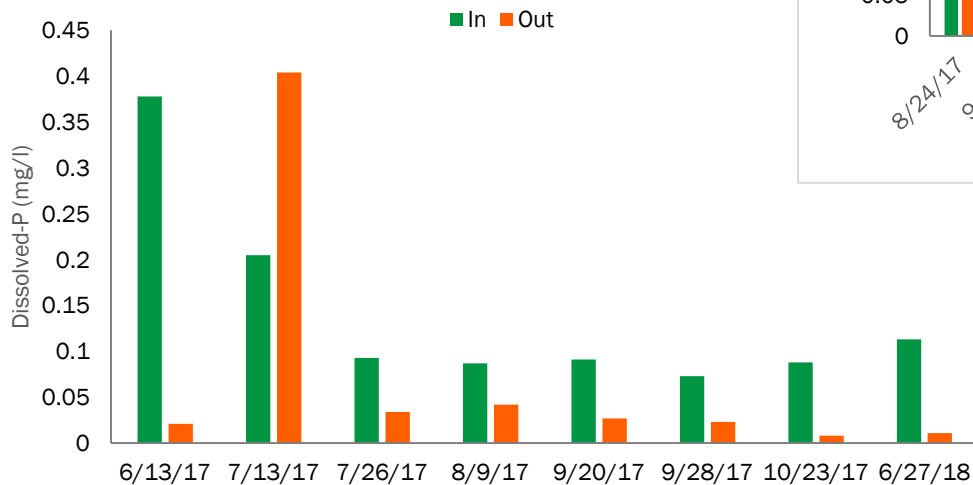


POND RETROFIT DISSOLVED-P REMOVAL

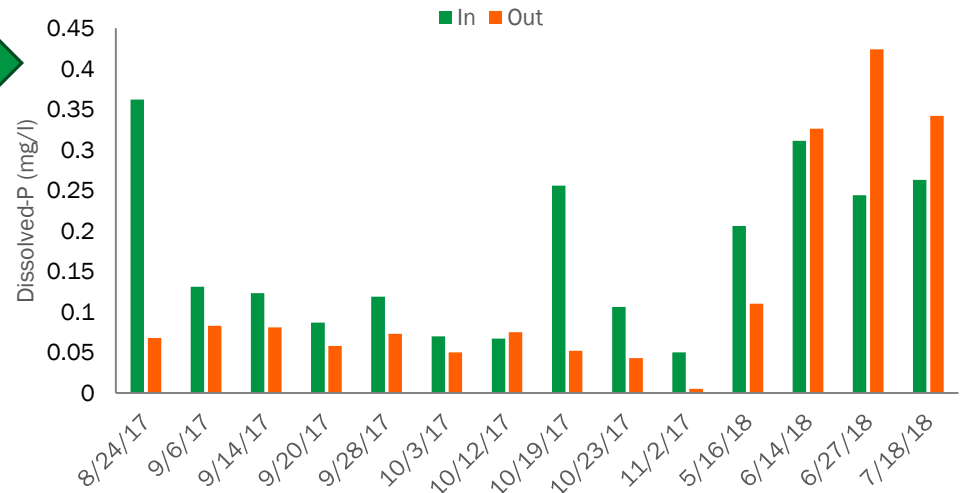
33% biochar in media

53% average removal
(four release event removed)

Crystal Dissolved-P Removal



Champlin Dissolved-P Removal



0% biochar in media

76% average removal
(one release event removed)

TAKE-AWAY POINTS

- Iron-biochar-sand mix is proven to be effective in phosphorus and *E.coli* removal.
- For all sites, removal efficiency increased with the increase of inflow concentration of *E.coli*, meaning that *E.coli* concentration is not a limiting factor and it hasn't reached the removal capacity of biochar applied.
- Utility box has pea rocks on top of slotted PVC and pond retrofit has socked PVC directly buried in the media, socked PVC has been causing clogging and pipe floatation. Use of pea rocks is recommended.
- Champlin pond bench was designed to have standing water at all times and Crystal pond bench was dry half of the season. Crystal average TP removal is higher than Champlin. Inundation at all times is not ideal for TP removal by iron filings.
- Raking the top of the sand filter and breaking iron bounds will significantly increase water flow through the filter and improve TP removal efficiency.