CASE STUDY ON BMP SELECTION

How adaptive management has driven the evolution of BMP selection in the Town of Bluffton.

Background

The May River, development & water quality.

May River Importance

- Historic & Cultural uses

- Adds to the quality of life for citizens

May River Importance

- Direct & indirect economic impacts

- Natural resource populations harvested & used

Bluffton Expands

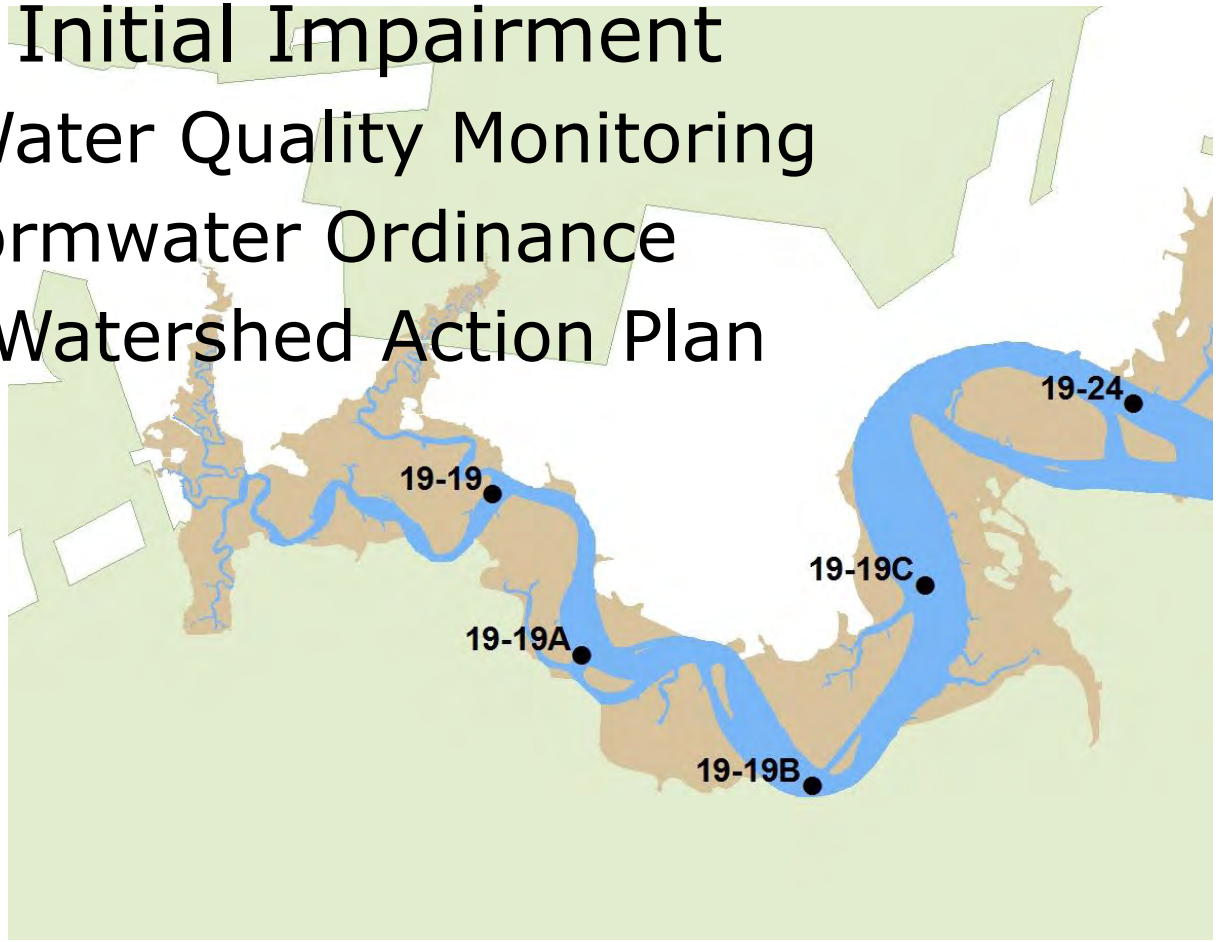
- Originally 1 sq. mi.
- Currently 54 sq. mi.
  - 7 Development Agreements
    - 90% of the Town limits

Bluffton Expands

- Development began with the health of the May River in mind.
  - Baseline Study
    - Establish pre-development benchmark
  - Development Agreement language
    - Must stay current with Stormwater Ordinance
    - Mitigate proposed impervious surface

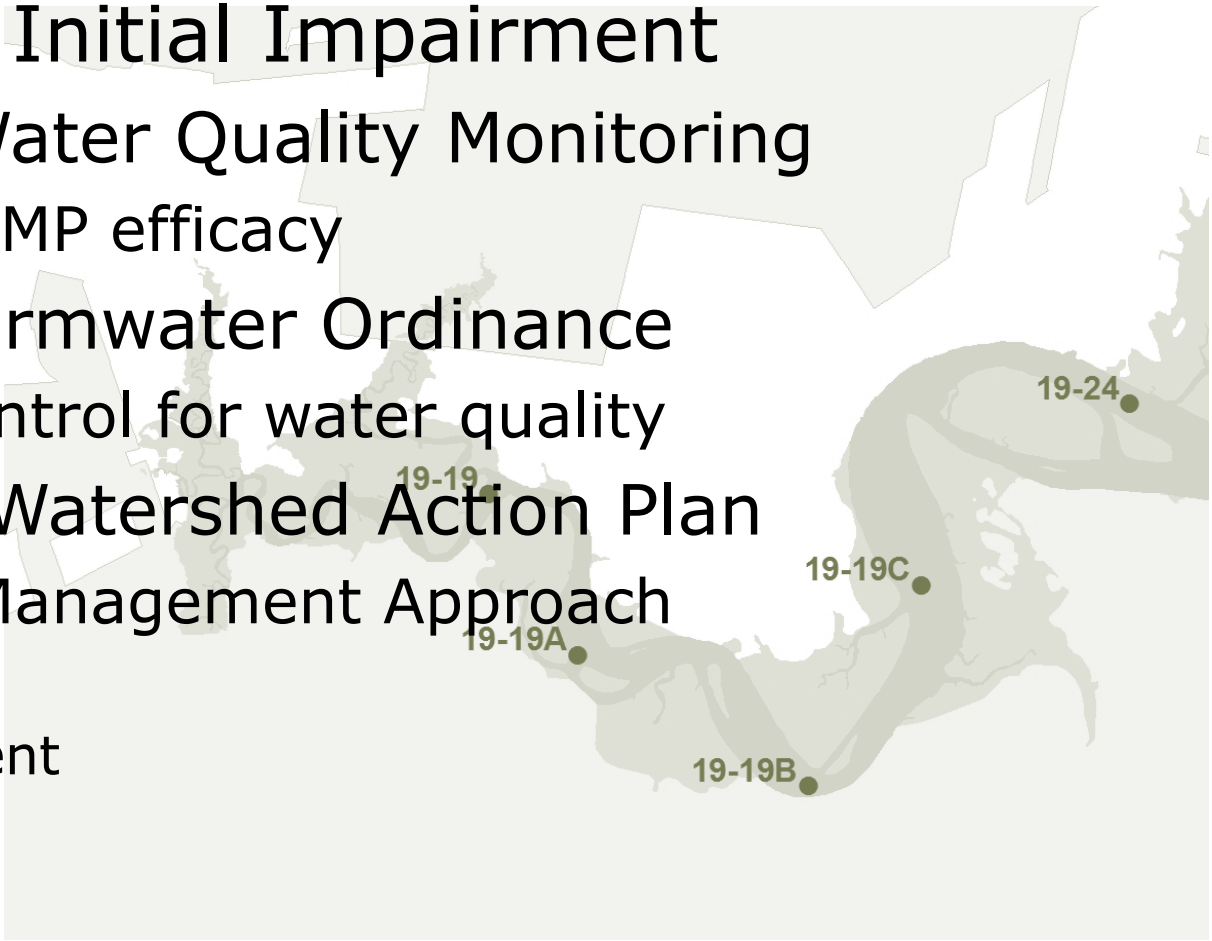
May River Impairment

- Reaction to Initial Impairment
  - Intensify Water Quality Monitoring
  - Update Stormwater Ordinance
  - May River Watershed Action Plan



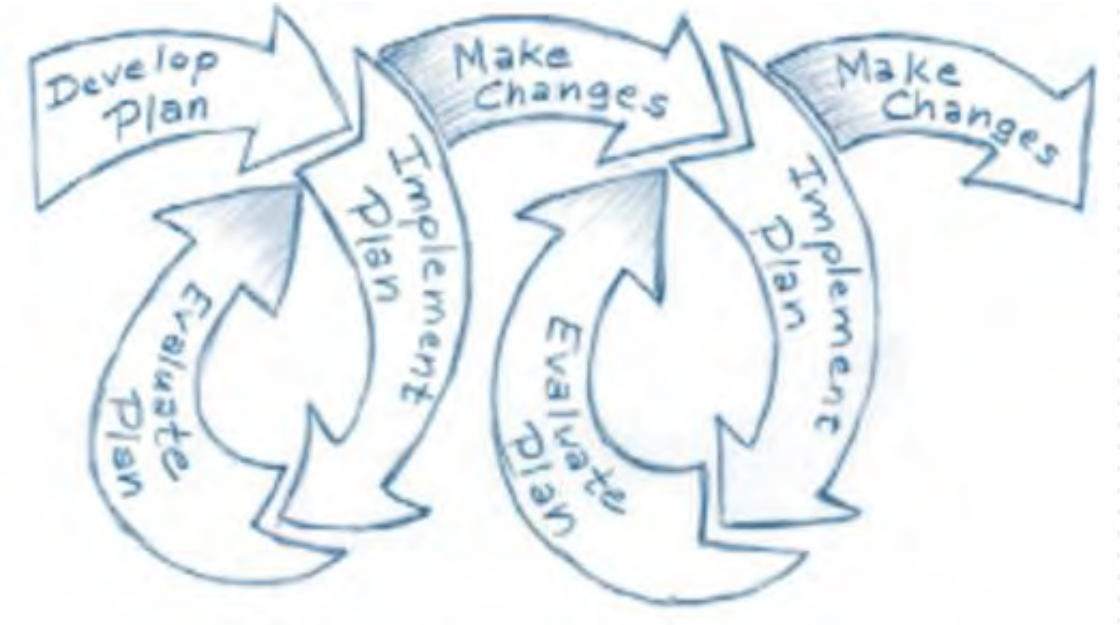
May River Impairment

- Reaction to Initial Impairment
  - Intensify Water Quality Monitoring
    - Evaluate BMP efficacy
  - Update Stormwater Ordinance
    - Volume control for water quality
  - May River Watershed Action Plan
    - Adaptive Management Approach
      - Develop
      - Implement
      - Evaluate
      - Modify



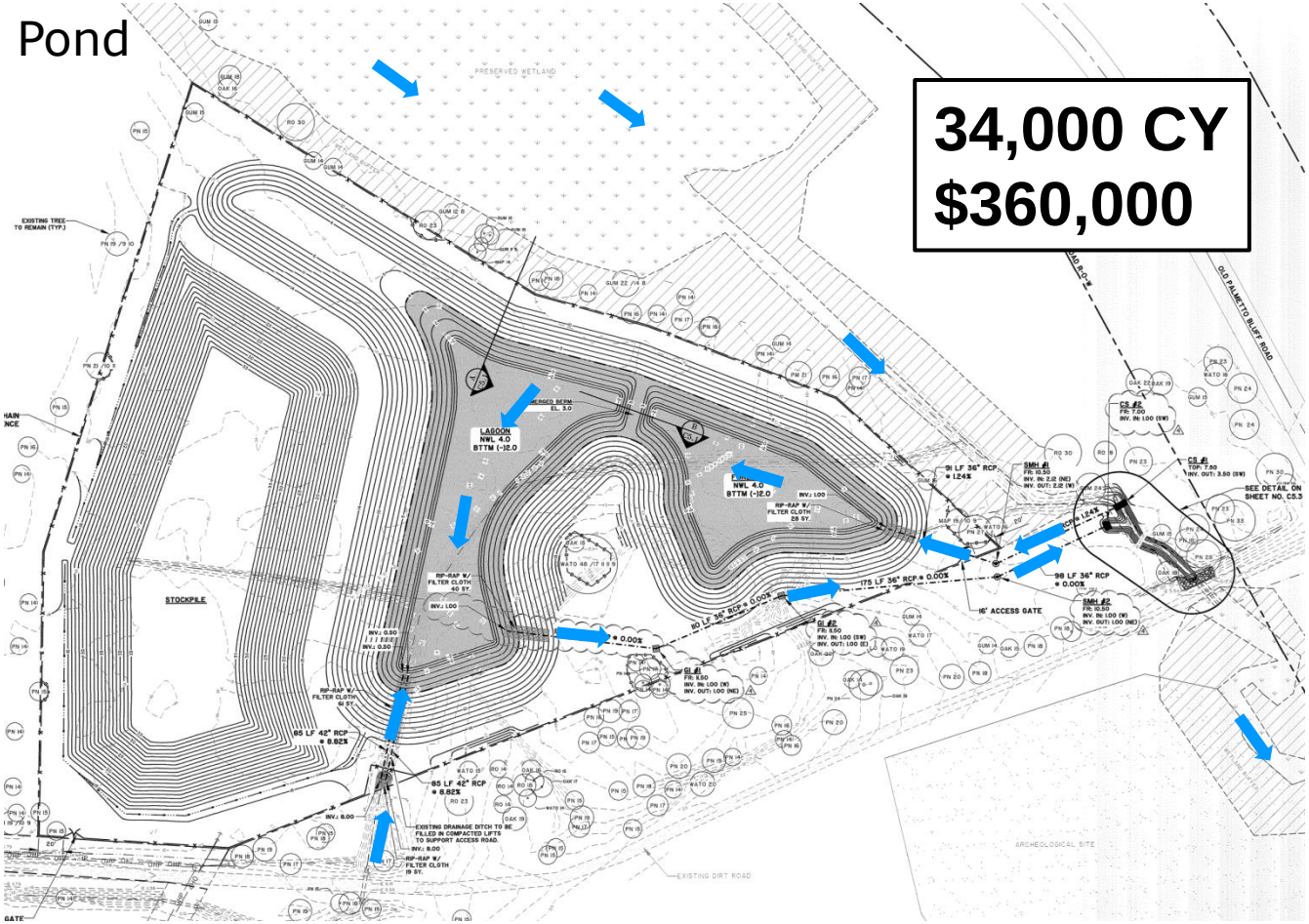
Case Study

Using pre- vs. post- project water quality testing to complete the adaptive management loop.



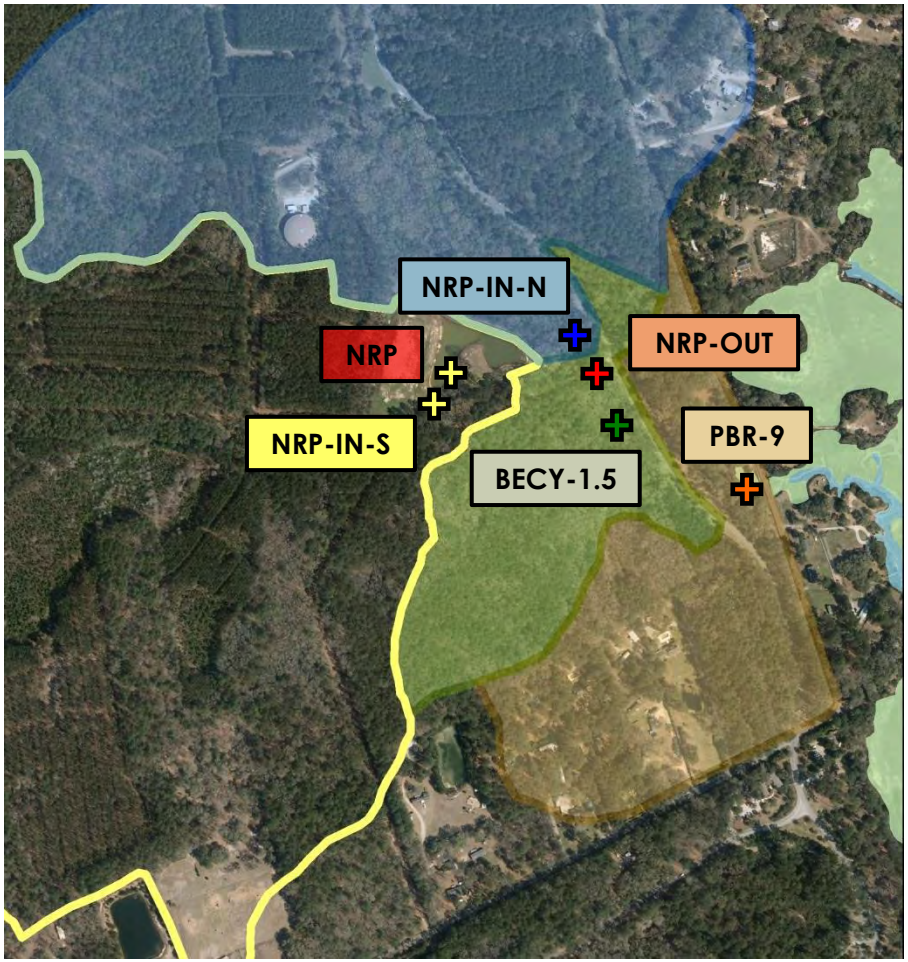
BMP Case Study

- New Riverside Pond



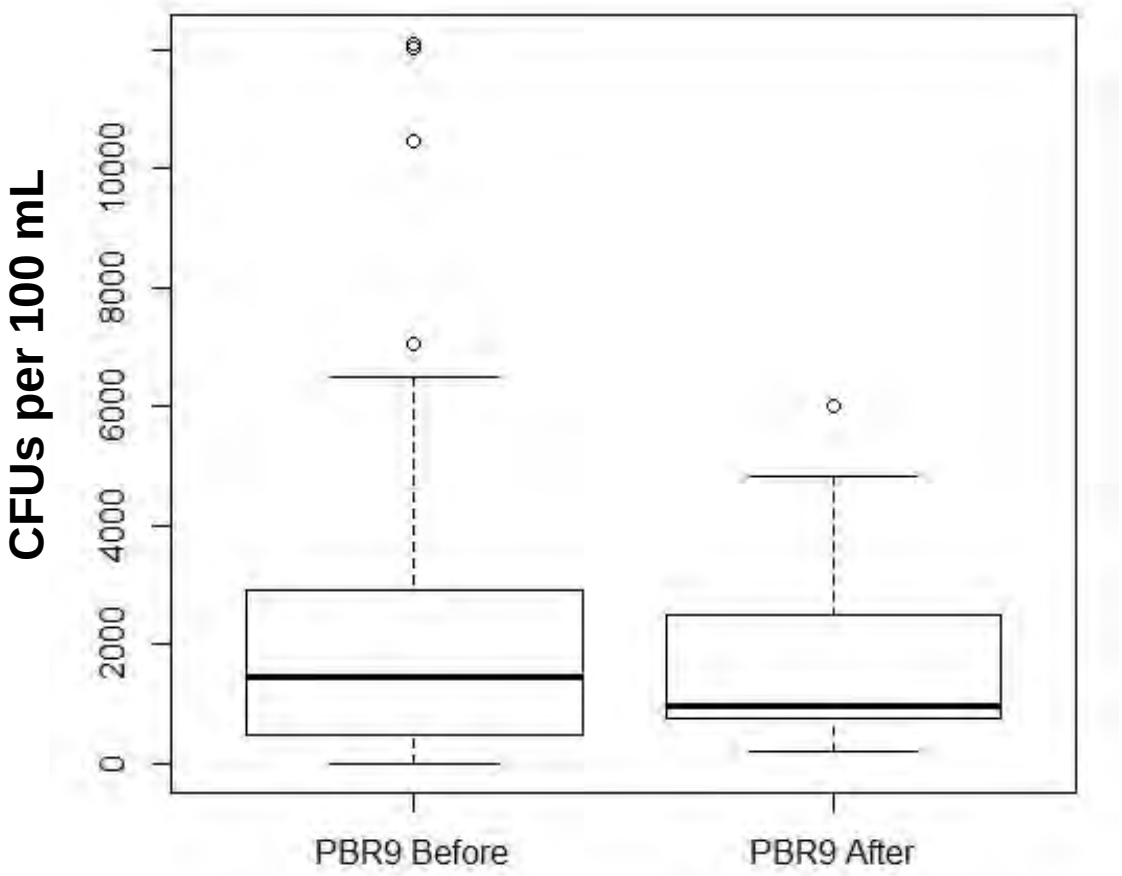
BMP Case Study

- New Riverside Pond
  - Existing Sampling Sites:
    - BECY-1.5, PBR-9
  - Added 4 Sampling Sites Post Project
  - Pre vs. Post Downstream Impact



BMP Case Study

- New Riverside Pond
  - Existing Sampling Sites:
    - BECY-1.5, PBR-9
  - Added 4 Sampling Sites Post Project
  - Pre vs. Post Downstream Impact:
    - Not statistically significant evidence that the mean concentration of fecal coliform at PBR9 before pond construction (2406 CFUs per 100 mL) is greater than that after construction (1863 CFUs per 100 mL).



Lessons Learned

- BMP Selection changes based on site location:
  - Site BMPs at the water's edge.
  - Use In-Series BMPs to retain efficacy and slow velocity.
  - Remove volume instead of concentration if efficacy cannot be maintained.

BMP Case Study

- Pine Ridge BMP Retrofit
  - Irrigation reuse
  - Pre Project Data Collection
    - Rainfall
    - Outfall Pipe Velocity
    - Pond Level Loggers

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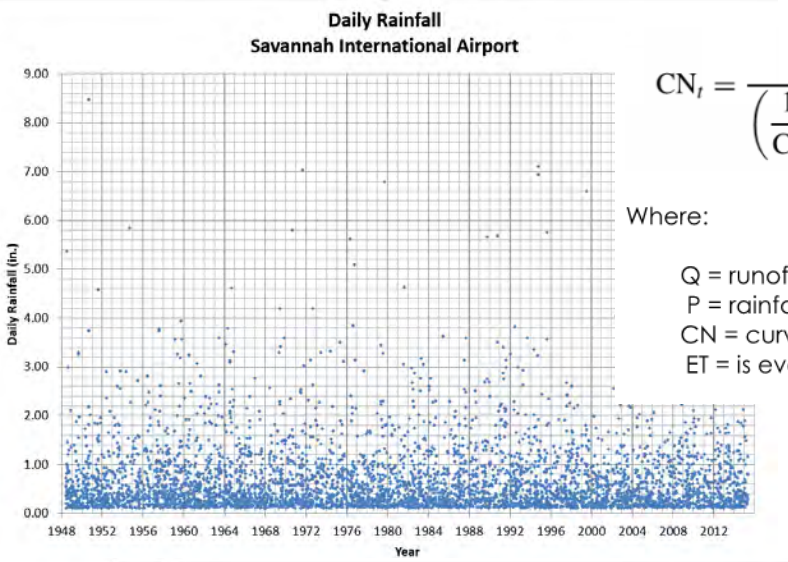
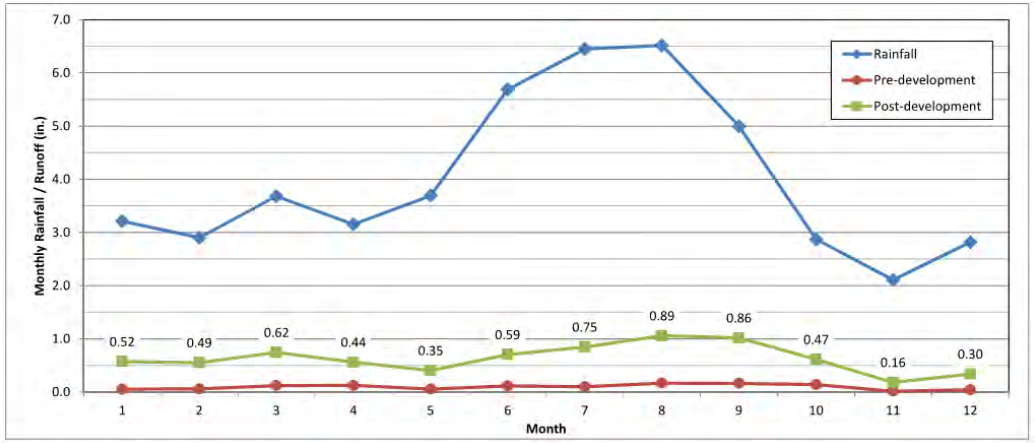
  - Project Design
    - Continuous Simulation
    - Pump Sizing
    - Subsurface Irrigation



$$CN_t = \frac{1200}{\left(\frac{1200}{CN_{t-1}}\right) + [ET - (P - Q)]_t}$$

Where:

Q = runoff (in)
P = rainfall (in)
CN = curve number
ET = is evapotranspiration



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Condition	TOTAL				
	Runoff Volume (ft3)	Captured Runoff (ft3) % of Runoff Vol	Loss (ft3) % of Runoff Vol	Target Irrigation Application Volume (ft3)	Actual Irrigation Application Volume (ft3) % of Target Irr. App. Vol.
Base	179,330,874	80,961,958 45%	98,368,916 55%	144,486,219	80,701,902 56%
Double Target Irr. App Rate	179,330,874	103,793,667 58%	75,537,208 42%	288,972,438	103,547,620 72%
Quadruple Target Irr. App. Rate	179,330,874	116,292,220 65%	63,038,655 35%	577,944,877	116,074,191 80%
Double Available Pond Vol.	179,330,874	97,058,191 54%	82,272,683 46%	144,486,219	96,524,071 67%
Quadruple Available Pond Vol.	179,330,874	113,541,442 63%	65,789,433 37%	144,486,219	112,459,191 78%
Constant 70 gpm PS / Pond	179,330,874	100,609,309 56%	78,721,565 44%	274,456,655	100,368,934 69%
Constant 100 gpm PS / Pond	179,330,874	109,084,500 61%	70,246,374 39%	392,057,123	108,858,561 75%
Constant 200 gpm PS / Pond	179,330,874	118,713,274 66%	60,617,600 34%	784,156,439	118,552,267 82%
Constant 300 gpm PS / Pond	179,330,874	121,827,188 68%	57,503,686 32%	1,176,234,877	121,768,779 84%
Constant 600 gpm PS / Pond	179,330,874	125,035,449 70%	54,295,426 30%	2,352,407,069	125,035,449 87%

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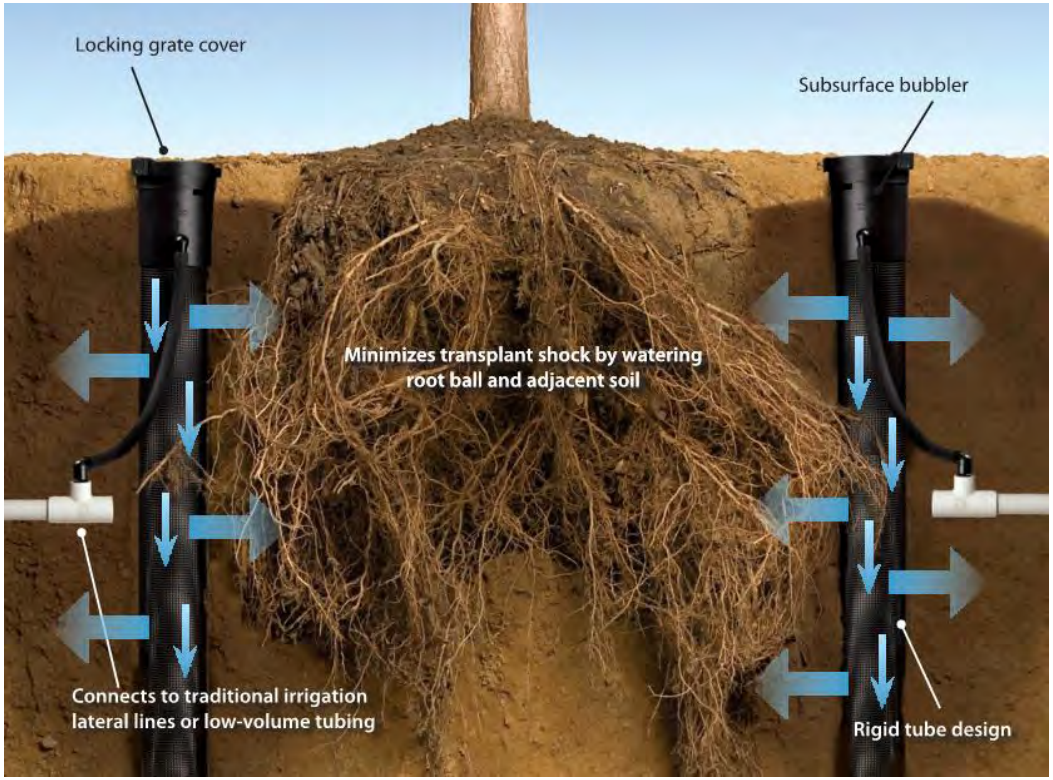

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- Pine Ridge BMP Retrofit
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    - Rainfall
    - Outfall Pipe Velocity
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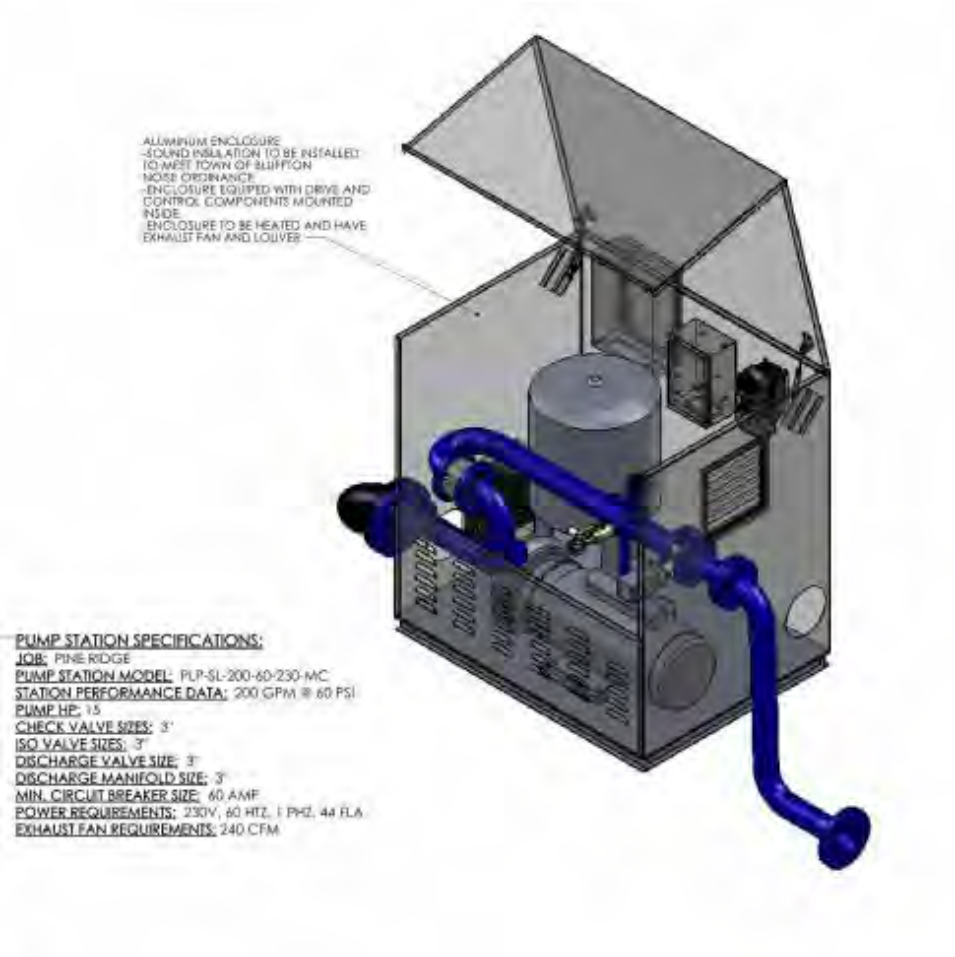
  - Project Design
    - Continuous Simulation
    - Pump Sizing
    - Subsurface Irrigation
  - Post Project Monitoring
    - Add Irrigation Pump Usage Report



Conclusion

- Adaptive management provides insight into which efforts should, or should not, continue. For those projects & programs that continue, identify additional data needs.
- Analysis provides guidance to determine which projects are most effective for our watershed conditions.