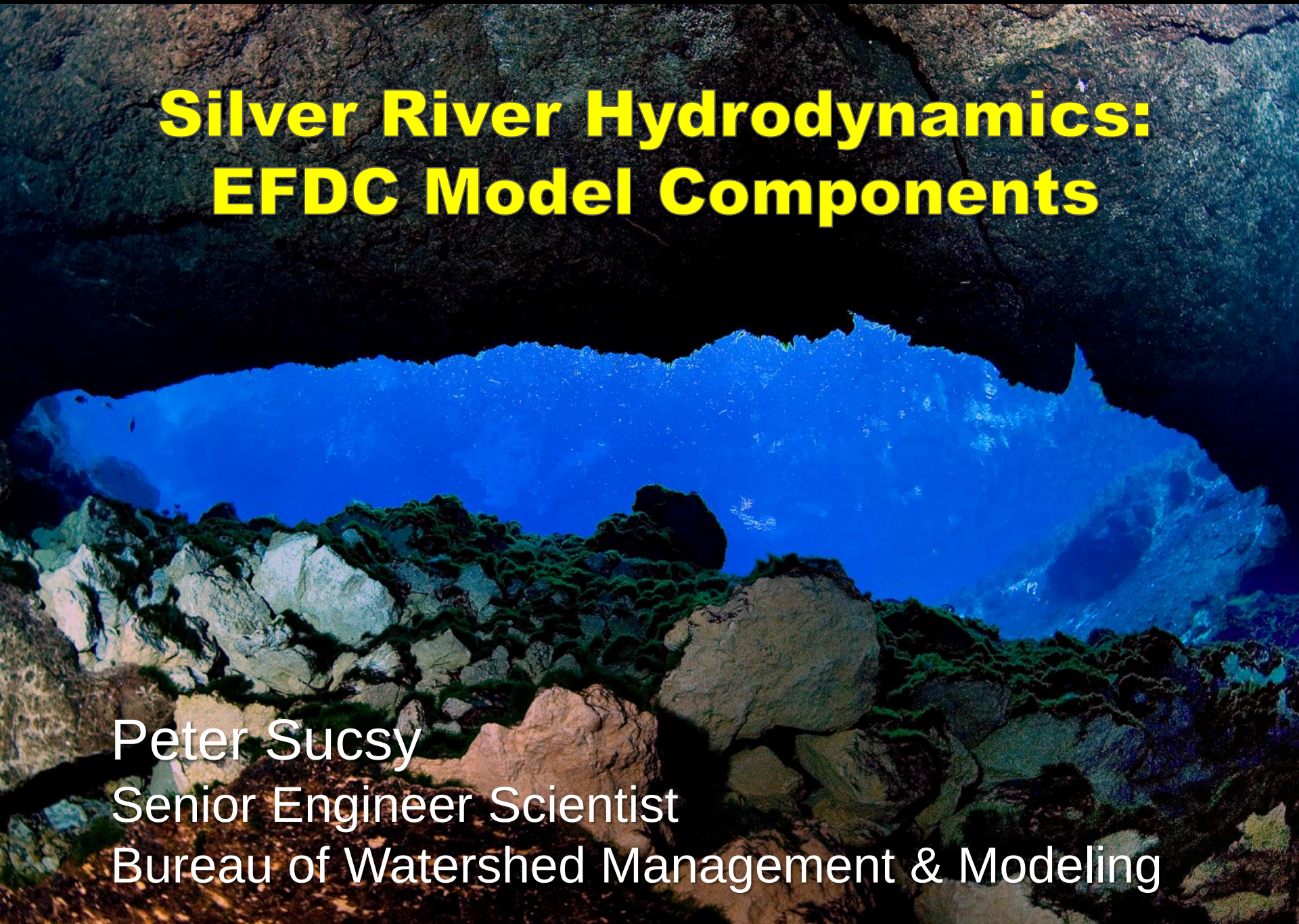

Silver River Hydrodynamics: EFDC Model Components

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Key Team Members

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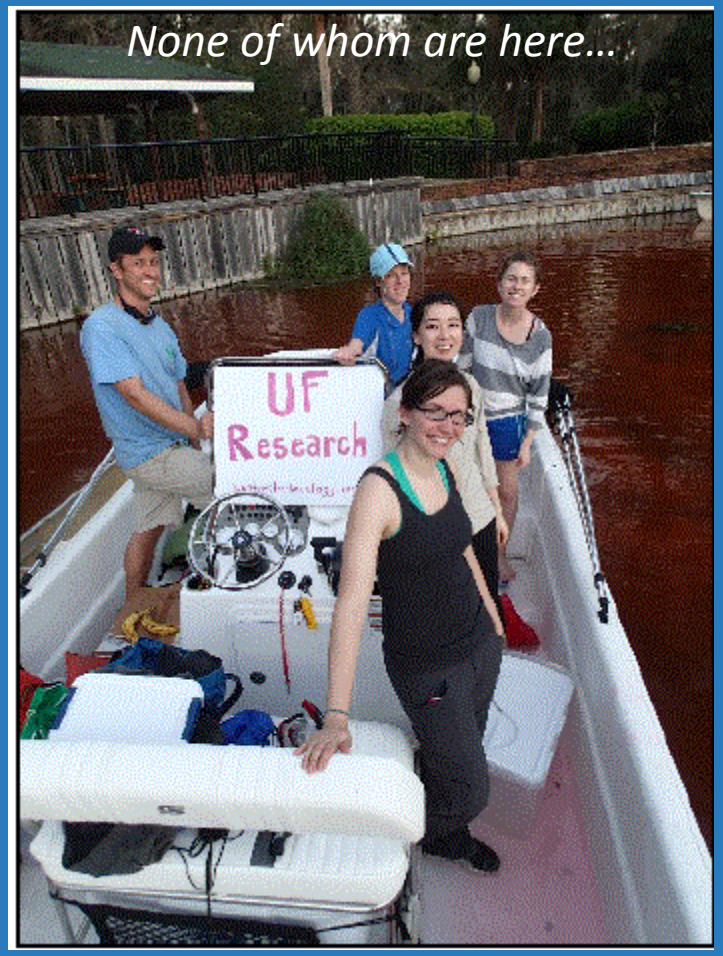
- Ed Carter, SJRWMD
- Jodi Slater, SJRWMD
- David Kaplan, UF
- Nathan Reaver, UF

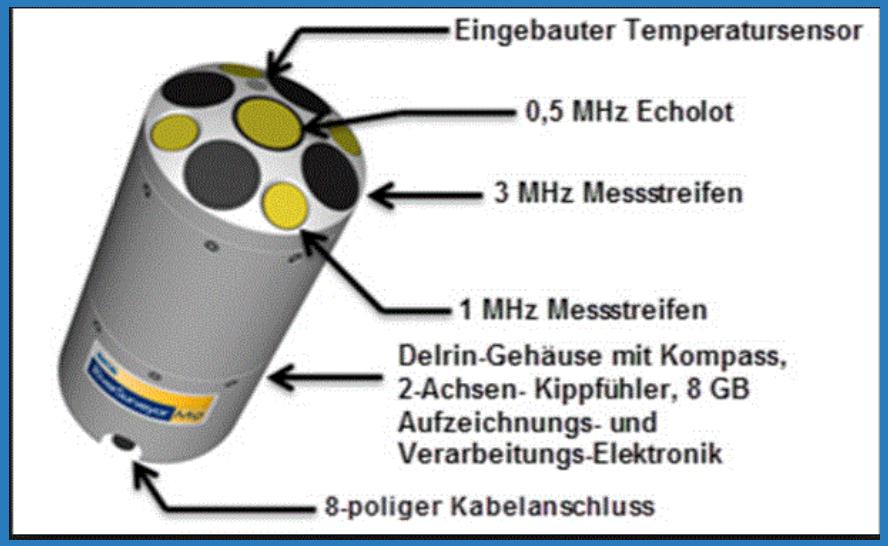


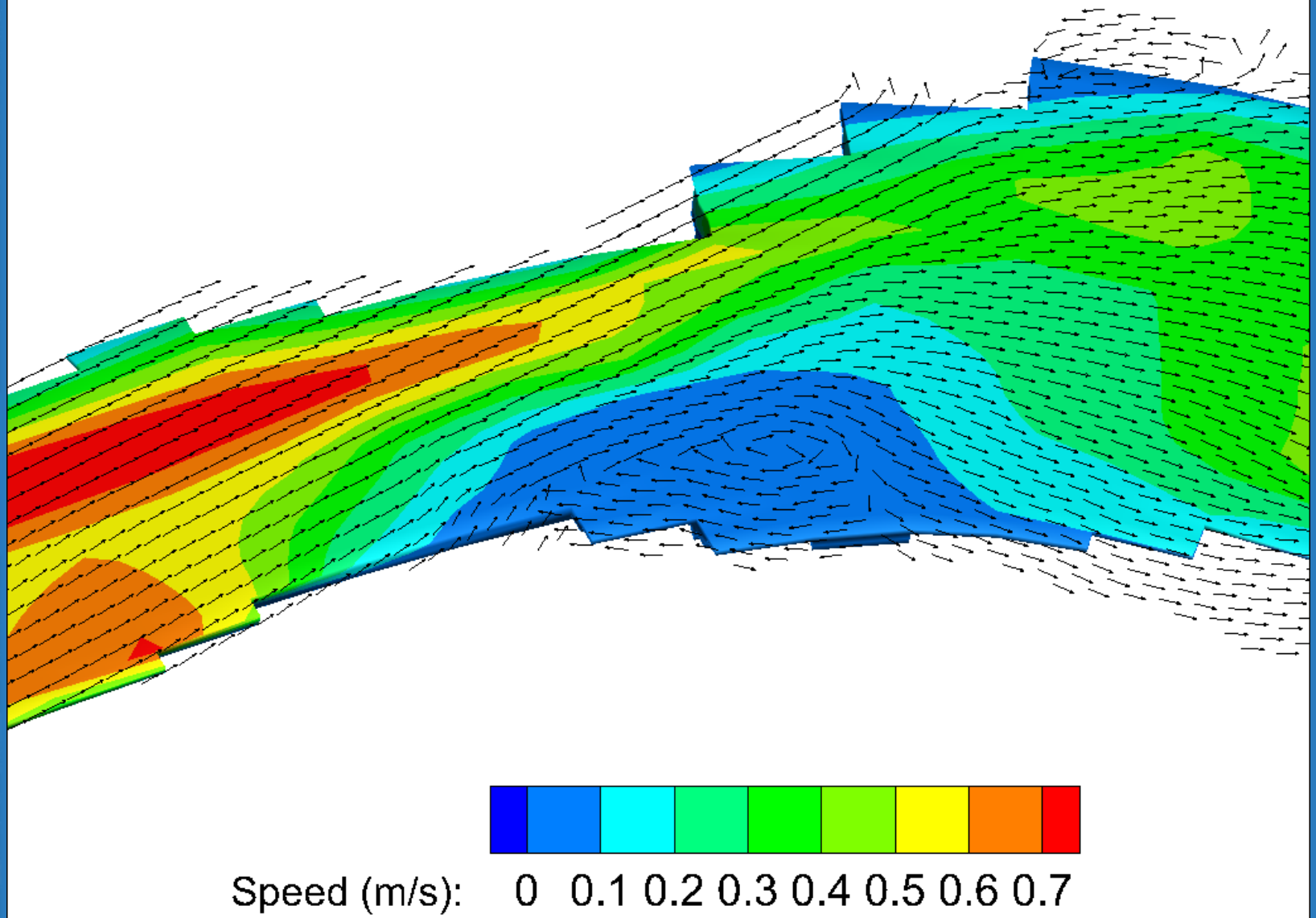
Outline

- Data Now Available
- Submersed vegetation controls stage-discharge relationship
- EFDC model is ready for scenario testing

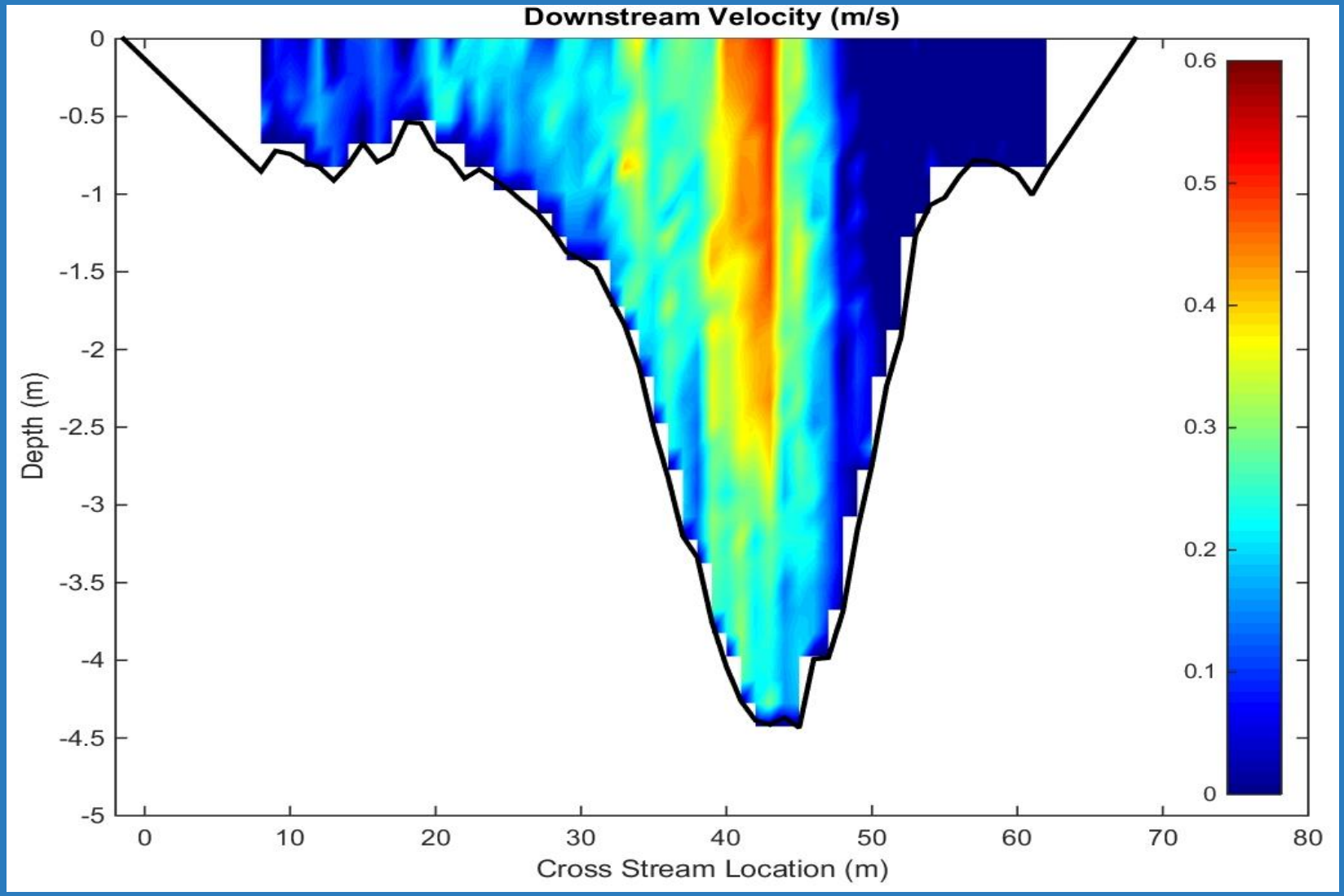
Data: ADCP Velocity & Depth

- 3D Velocity and Depth to Top-of-Canopy
- 1-m horizontal, 25-cm vertical resolution

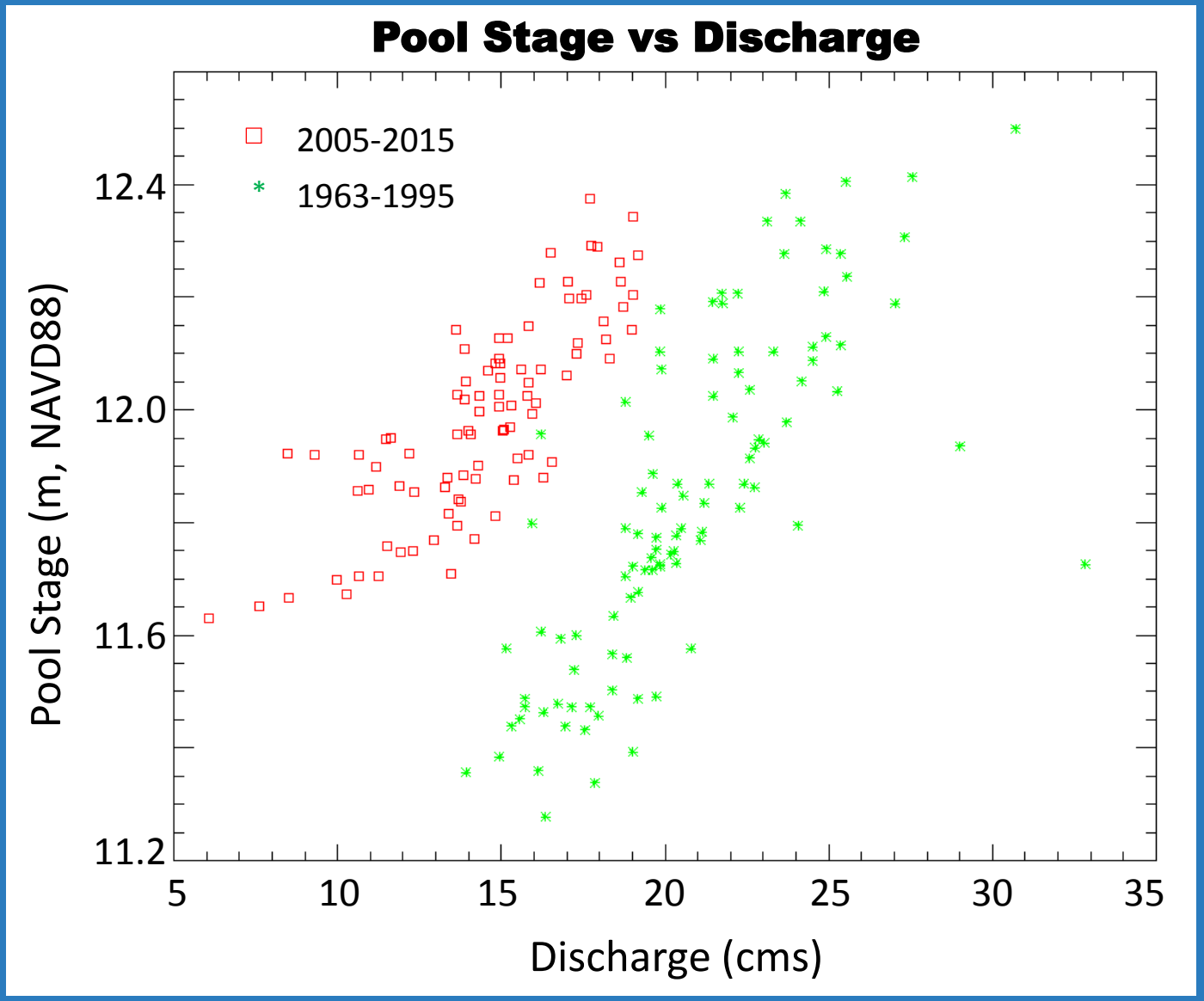


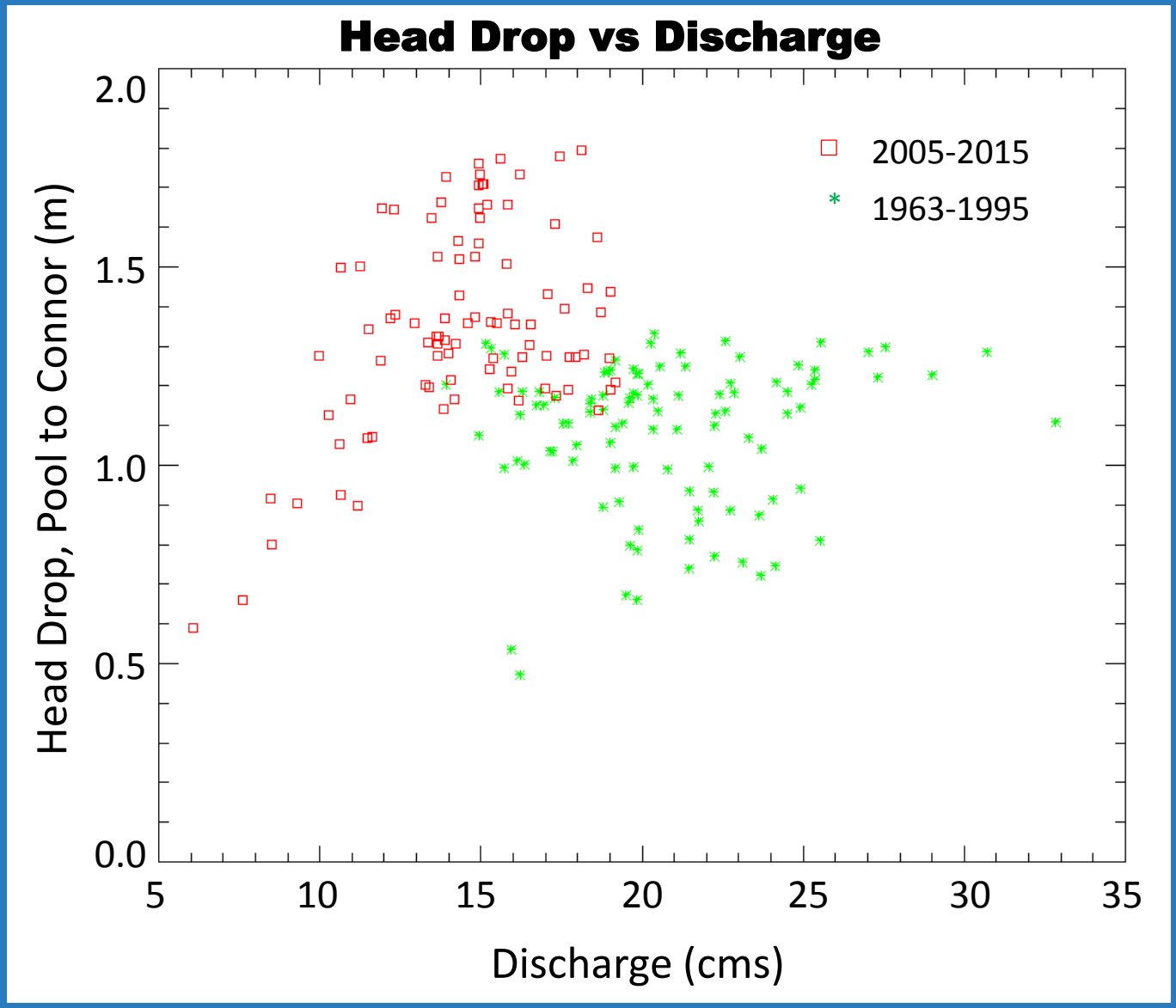

Speed (m/s): 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7

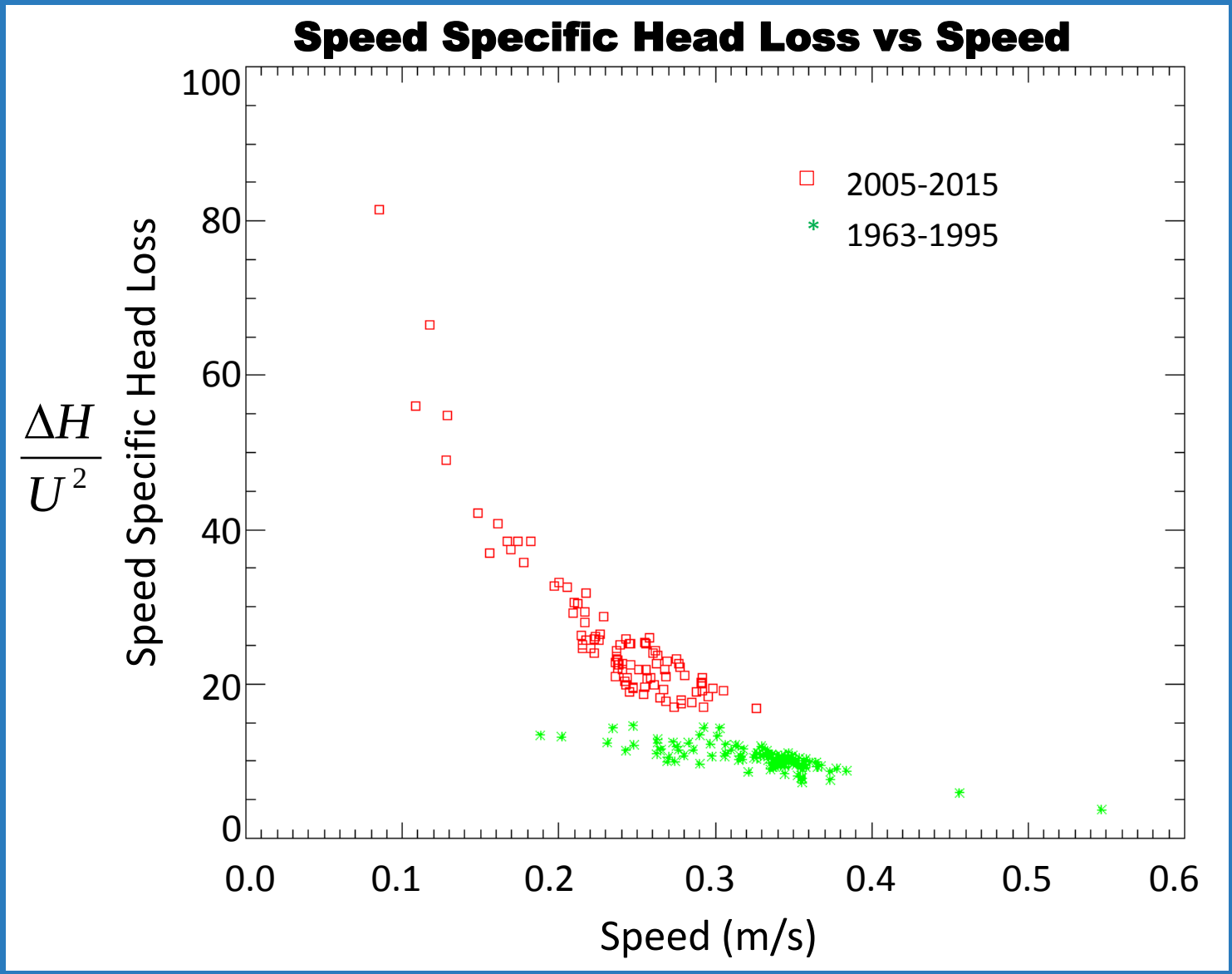
S-7 Cross Section



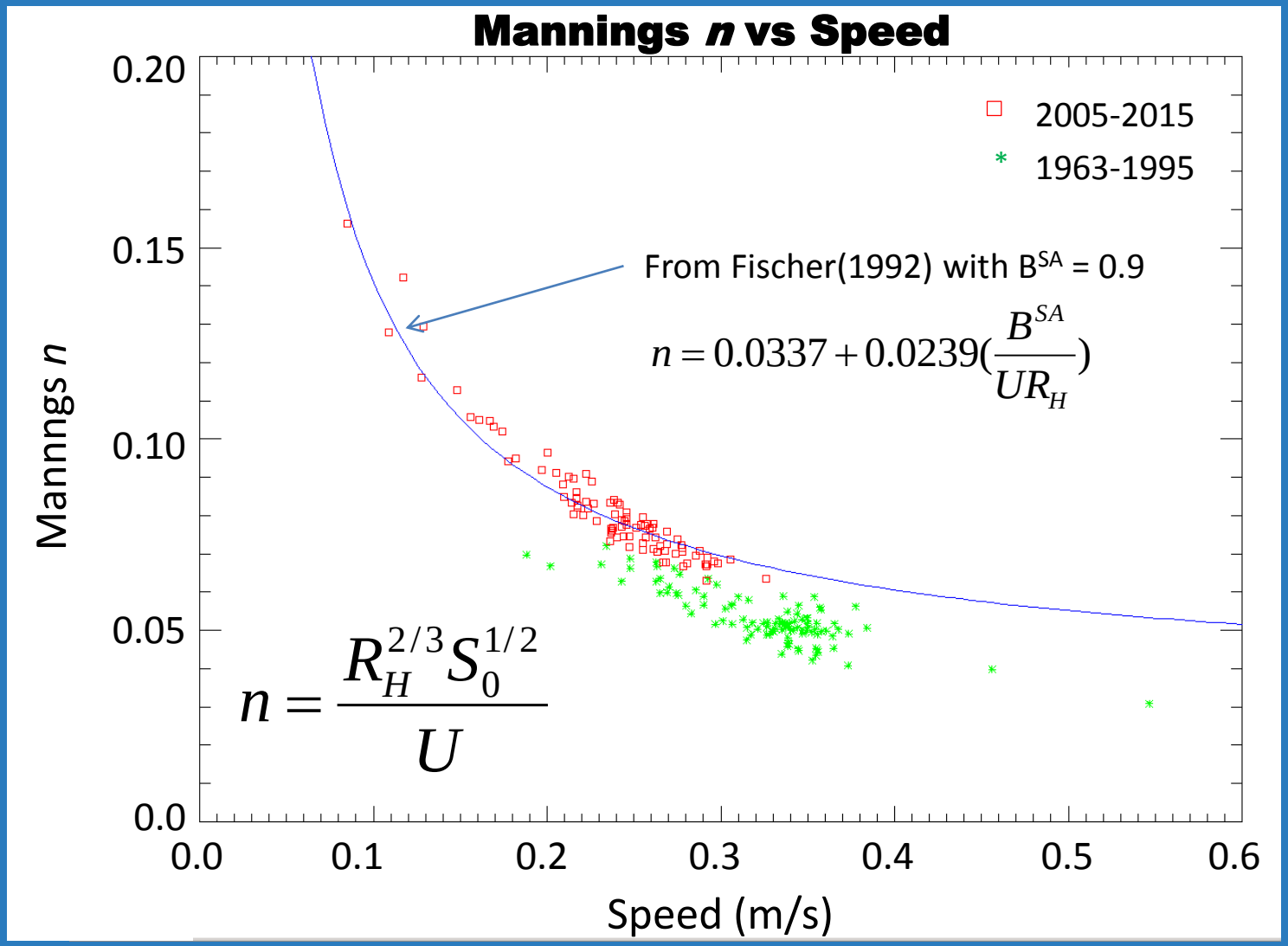
SAV Control of Stage-Discharge




Head Drop vs Discharge
Head Drop, Pool to Connor (m)
2.0
1.5
1.0
0.5
0.0
5
10
15
20
25
30
35
Discharge (cms)
2005-2015
1963-1995

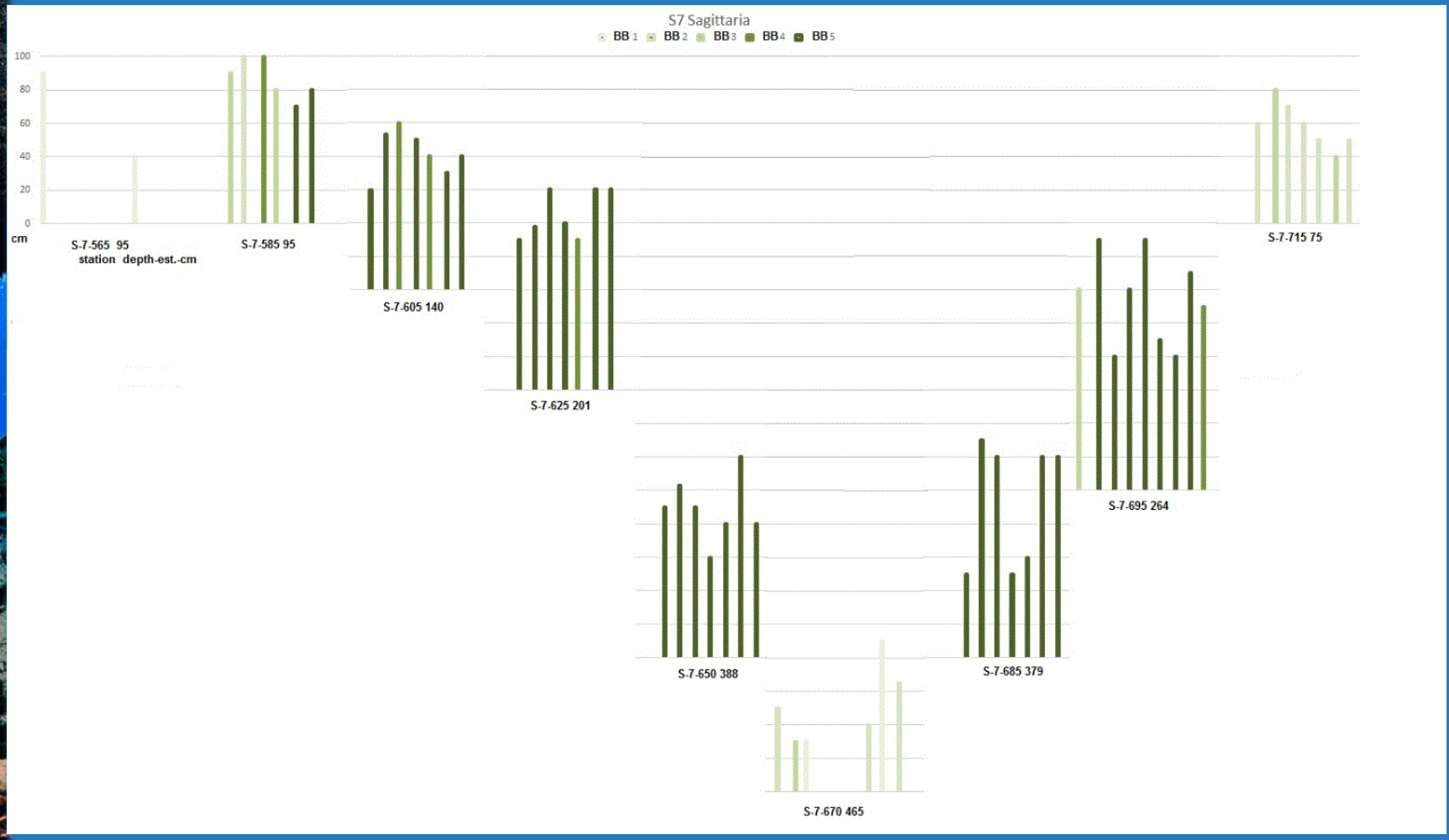

Speed Specific Head Loss vs Speed
$\frac{\Delta H}{U^2}$
Speed Specific Head Loss
100
80
60
40
20
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Speed (m/s)
2005-2015
1963-1995

Vogel (1994)


Mannings n vs Speed
0.20
0.15
0.10
0.05
0.0
Manngs n
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Speed (m/s)
2005-2015
1963-1995
From Fischer(1992) with B^SA = 0.9
$n = 0.0337 + 0.0239(\frac{B^{SA}}{UR_H})$
$n = \frac{R_H^{2/3} S_0^{1/2}}{U}$

Change in SAV Coverage or Reconfiguration ?

Observed Change in Sagittaria Density and Height at S-7



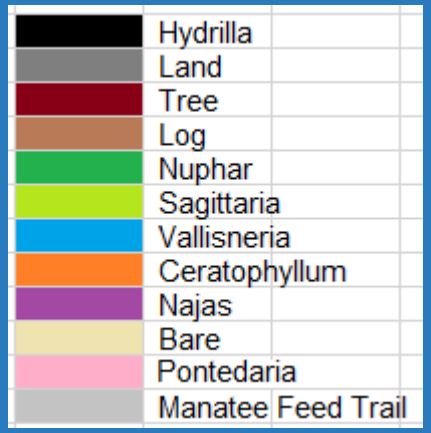
Variability of SAV at Transects

T-5

Aug '14 | Nov '15 | Feb '17

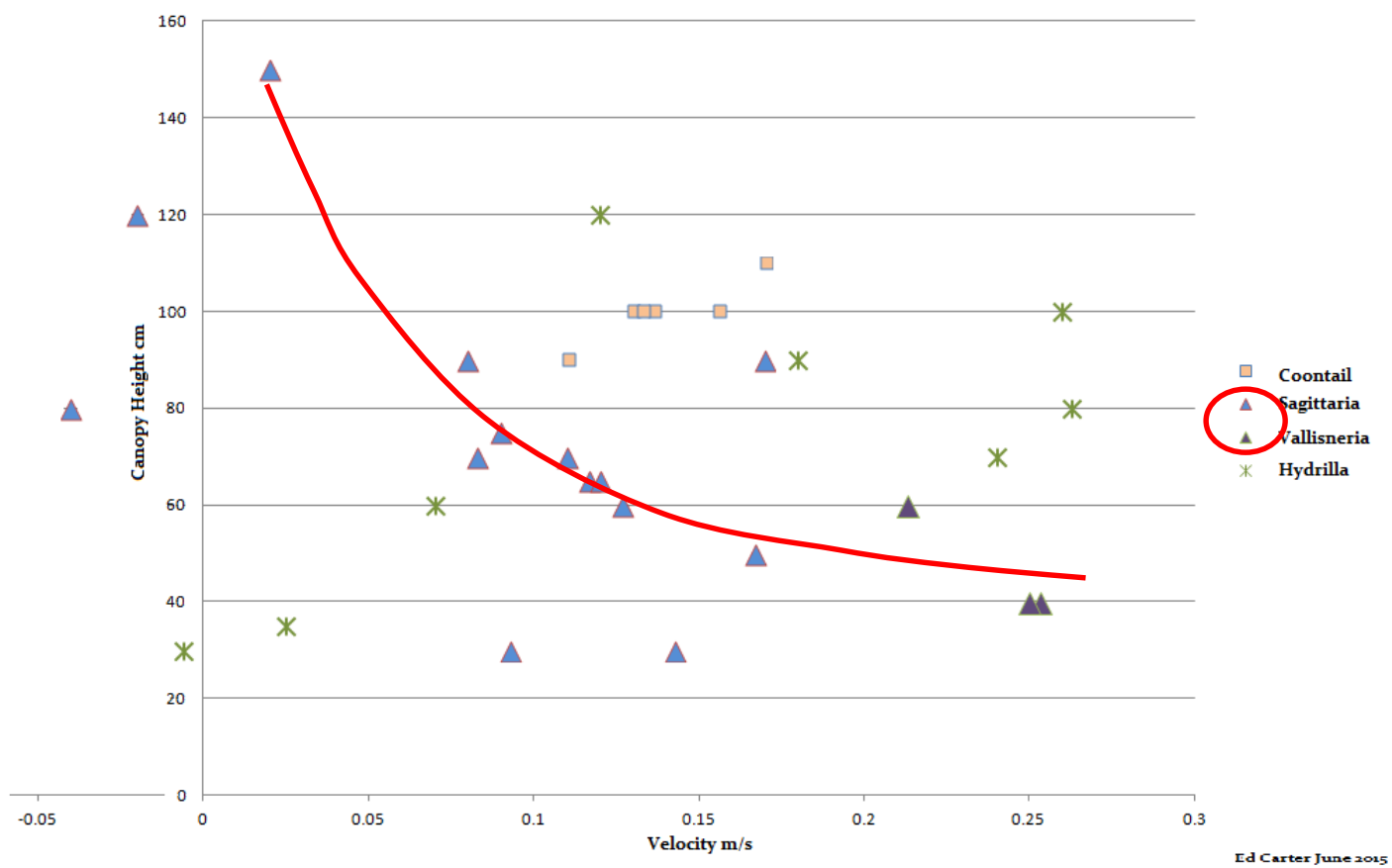
S-3

Aug '14 | Nov '15 | Feb '17

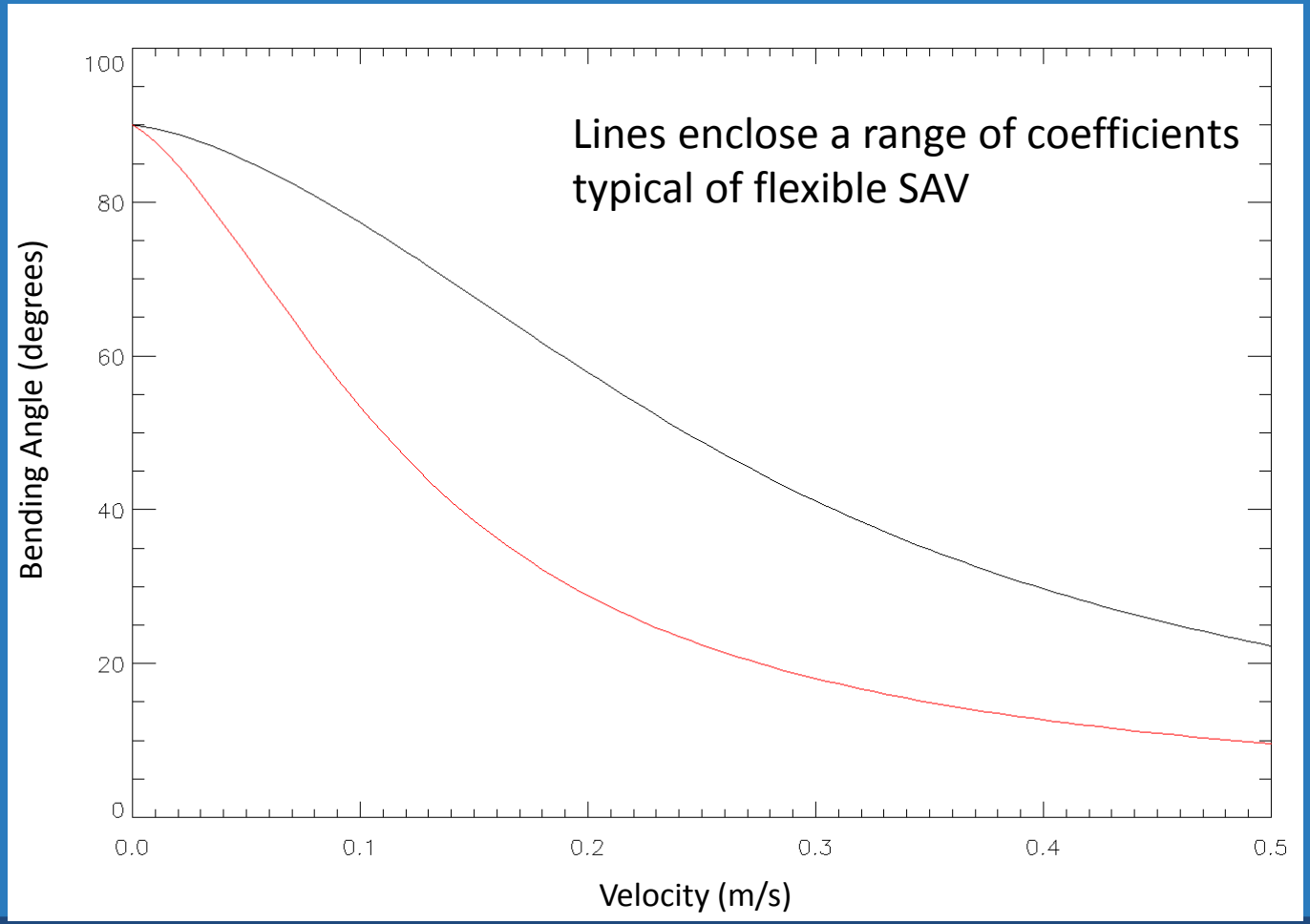



Manatee
feeding
"scar" --->
vegetation
Station
Nov22, 2016

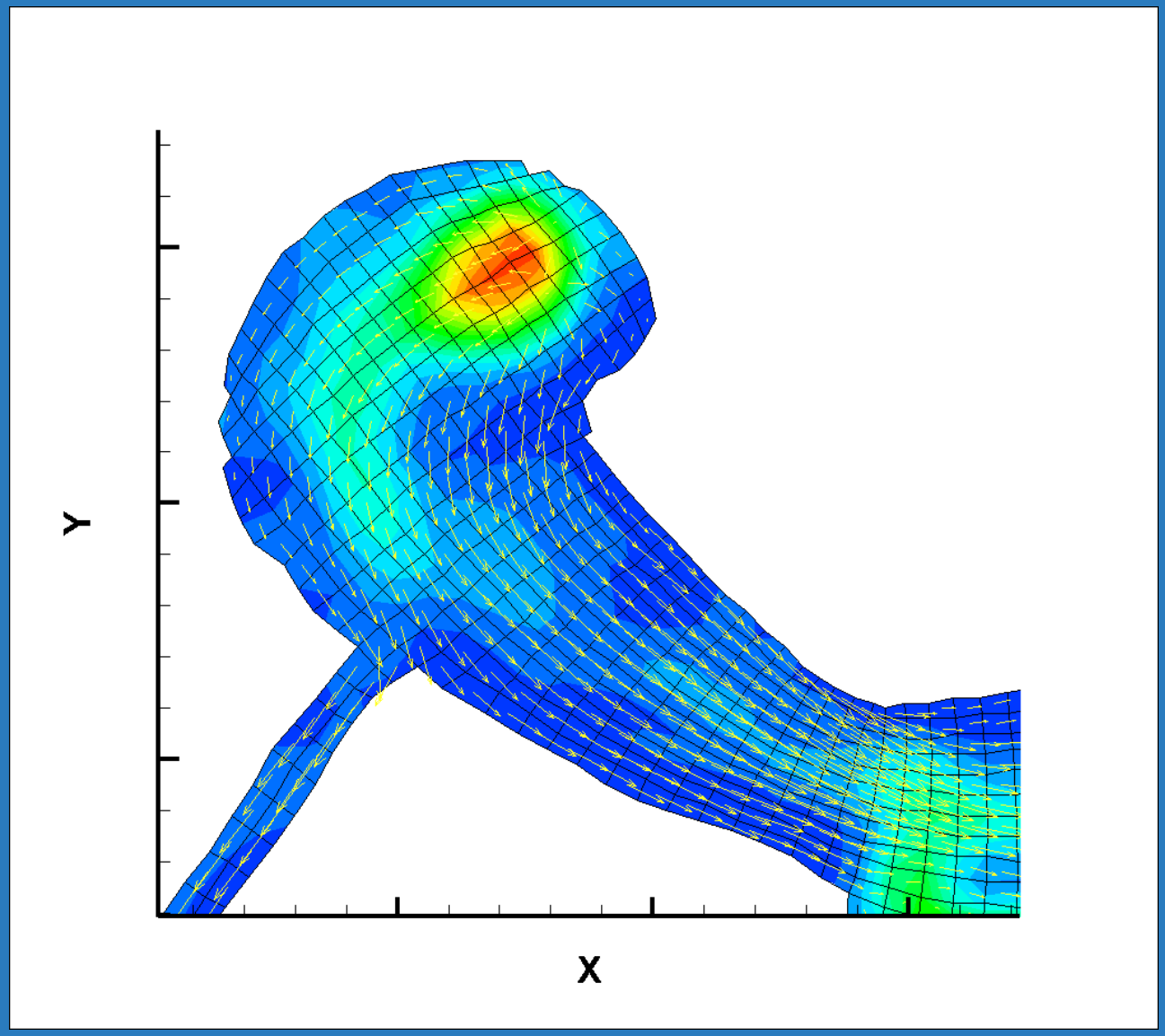
Reconfiguration



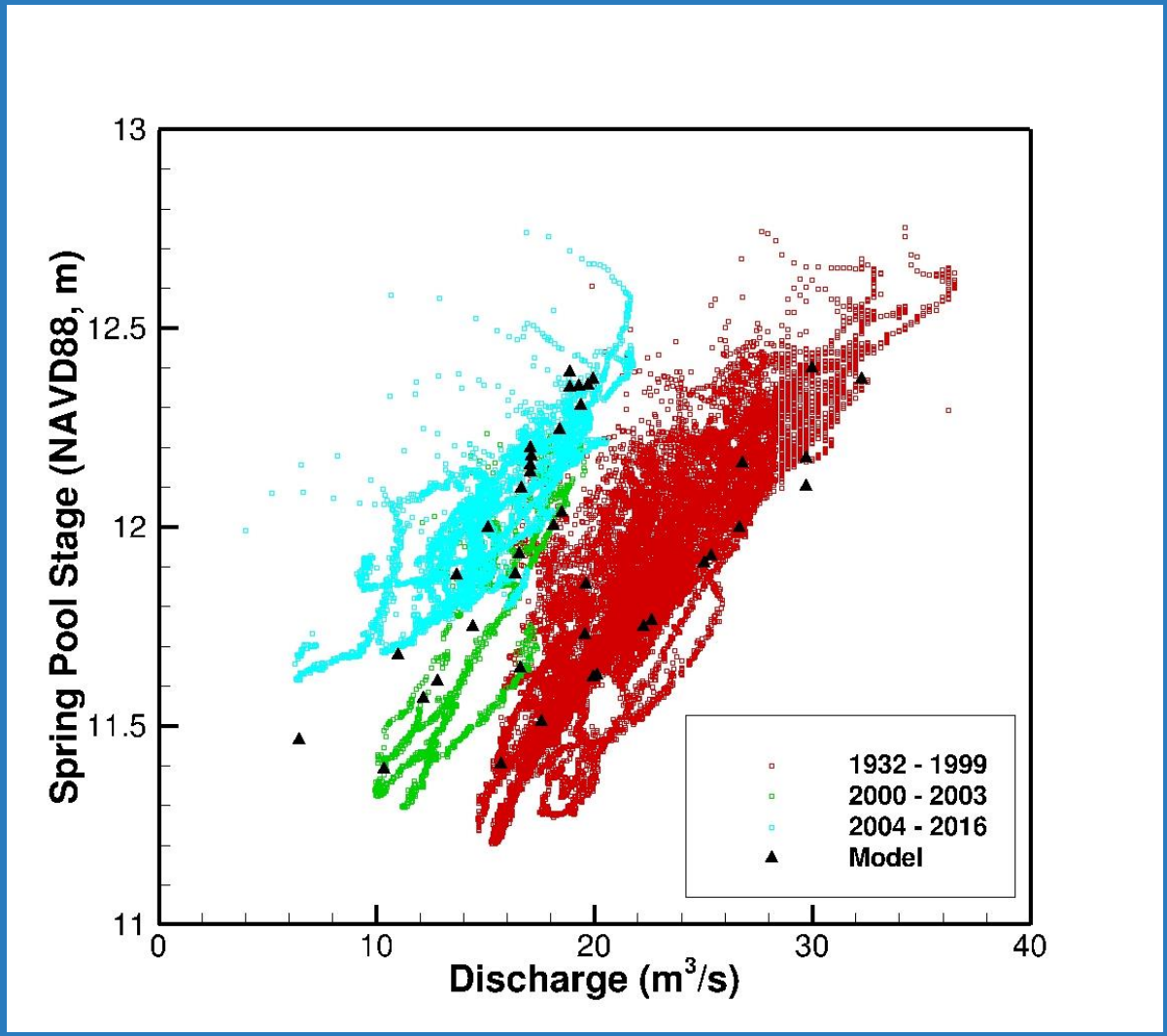
Bending Angle Resulting from Drag Force and Buoyancy Force (JC Green, 2005)



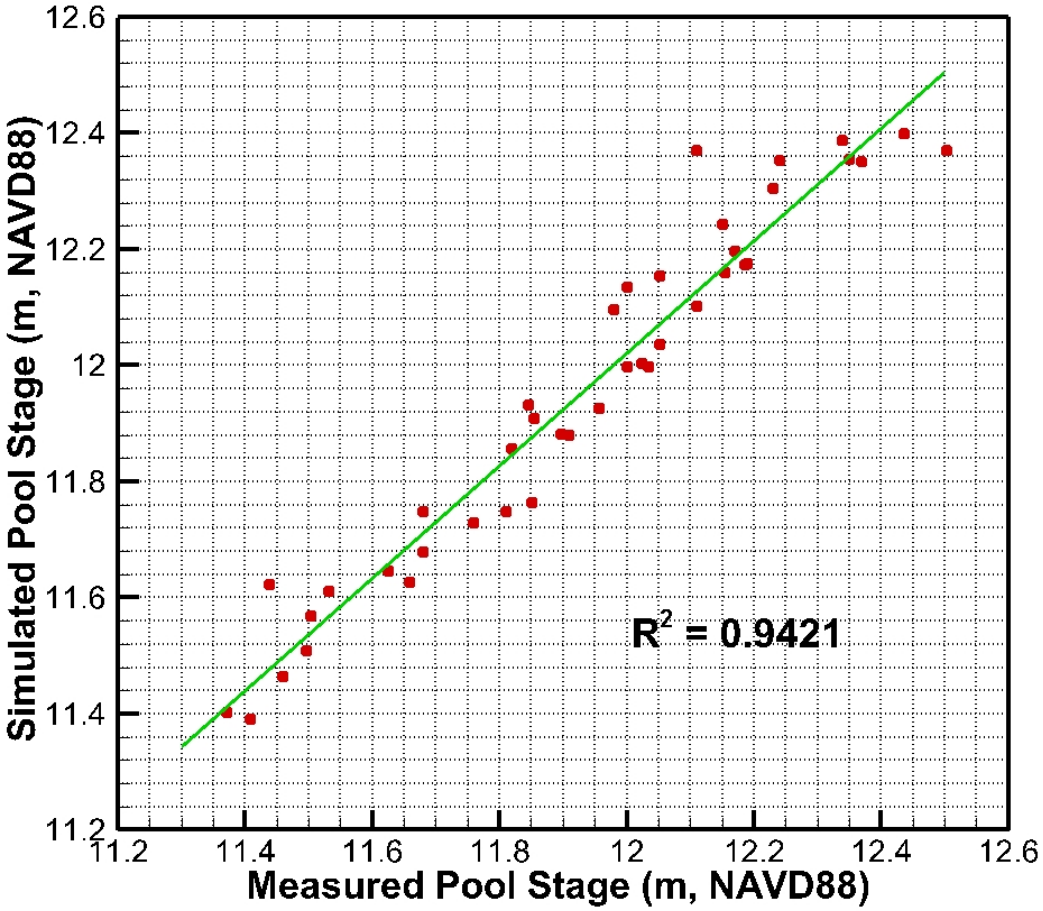
EFDC Model Scenarios



Range of Conditions Tested



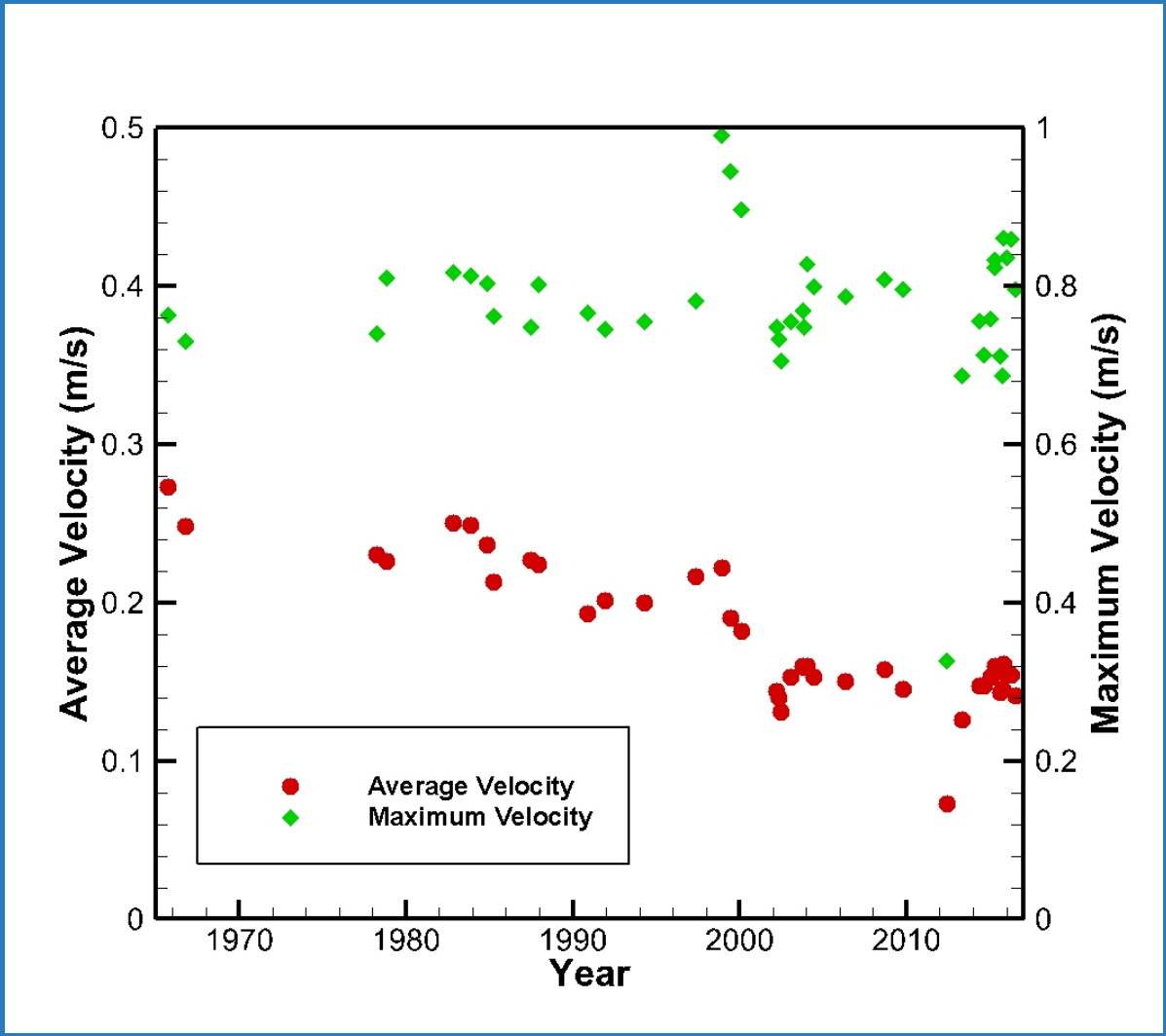
Observed Versus Simulated Pool Stage



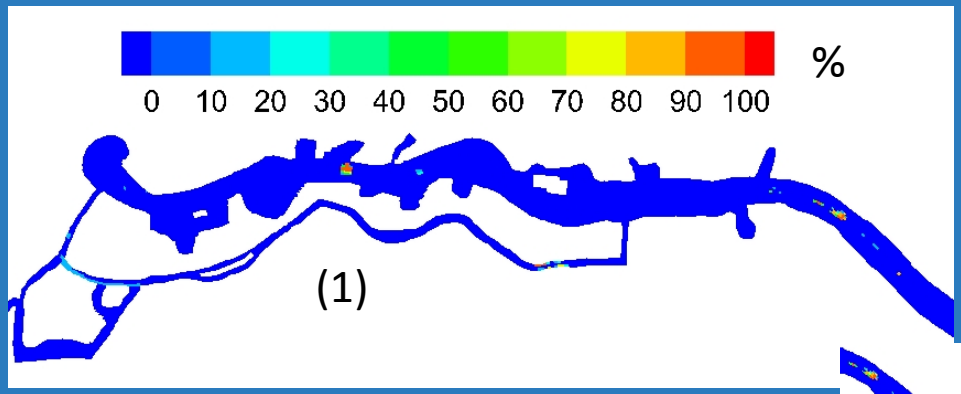
Vegetation Parameters Used in Model

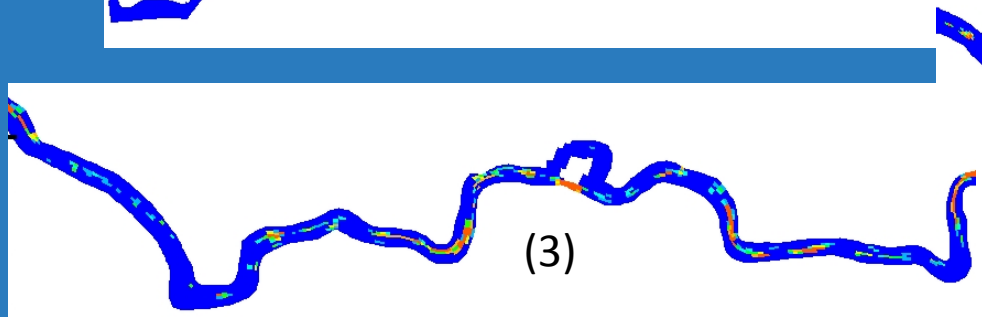
Period	SAV Height (m)	Drag Coefficient	Back Channel
1960 – 1966	0.34	1.0	No
1967 – 1998	0.34	1.0	Yes
1999 – 2000	0.40	1.2	Yes
2001 – 2004	0.52	1.4	Yes
2005 – 2016	0.70	1.4	Yes

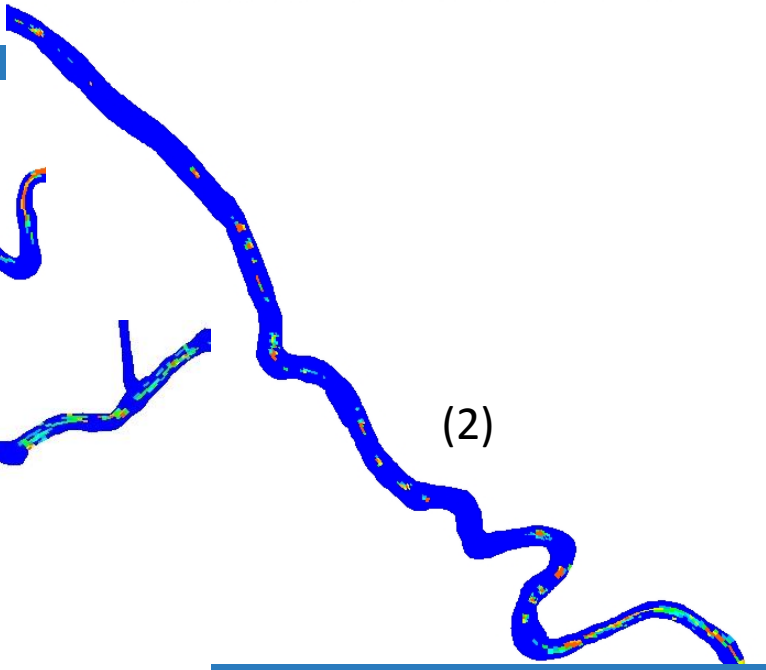
Simulated Stream Velocity Over Time

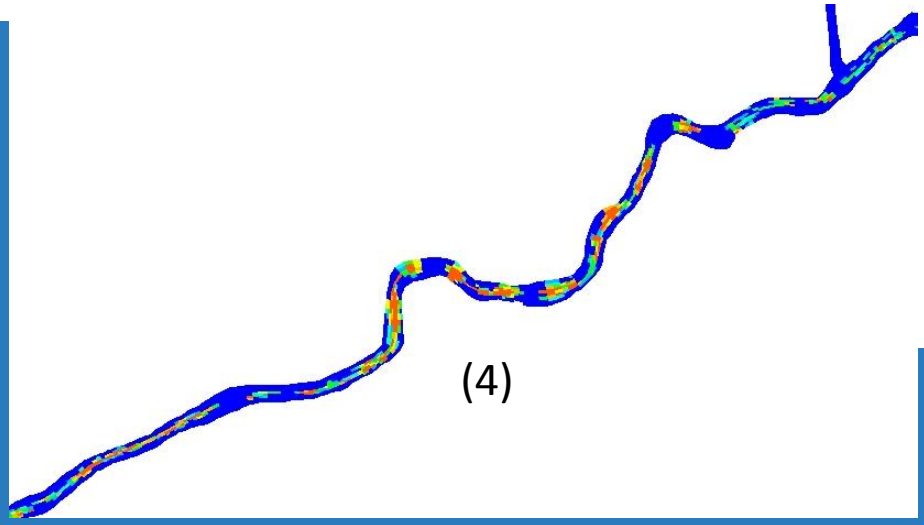


Fraction of Velocities Greater than 20 cm/s at Vegetation Layer for a Range of Discharge, 388 cfs – 685 cfs.









Thank you

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