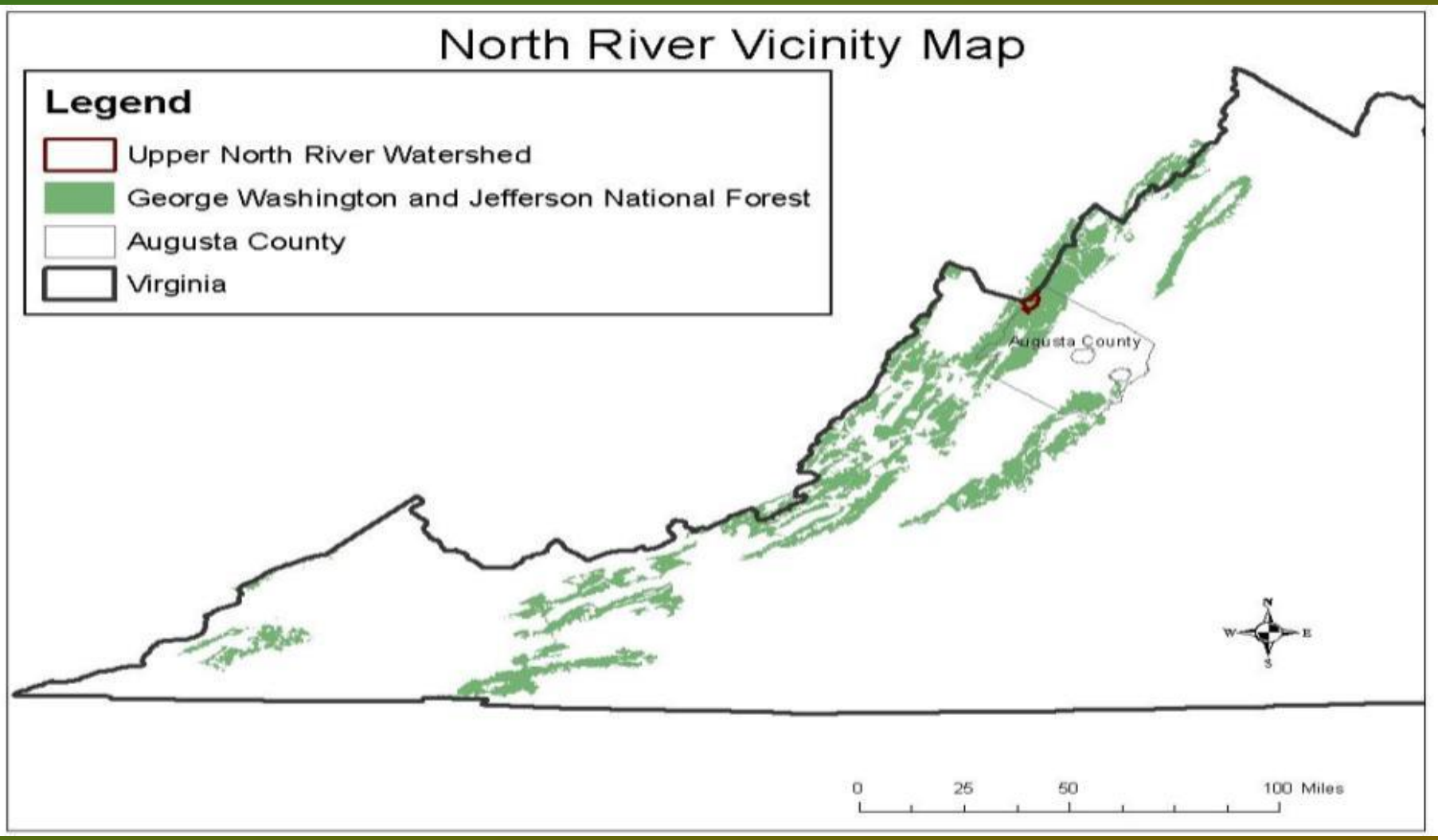
Stream habitat conditions in the North River before and after restoration activities.

Presentation by Brandon Fair and Stuart Robertson
Center For Aquatic Technology Transfer
Presenting Authors: Colin Krause, Andy Dolloff, Dawn Kirk, Craig Roghair

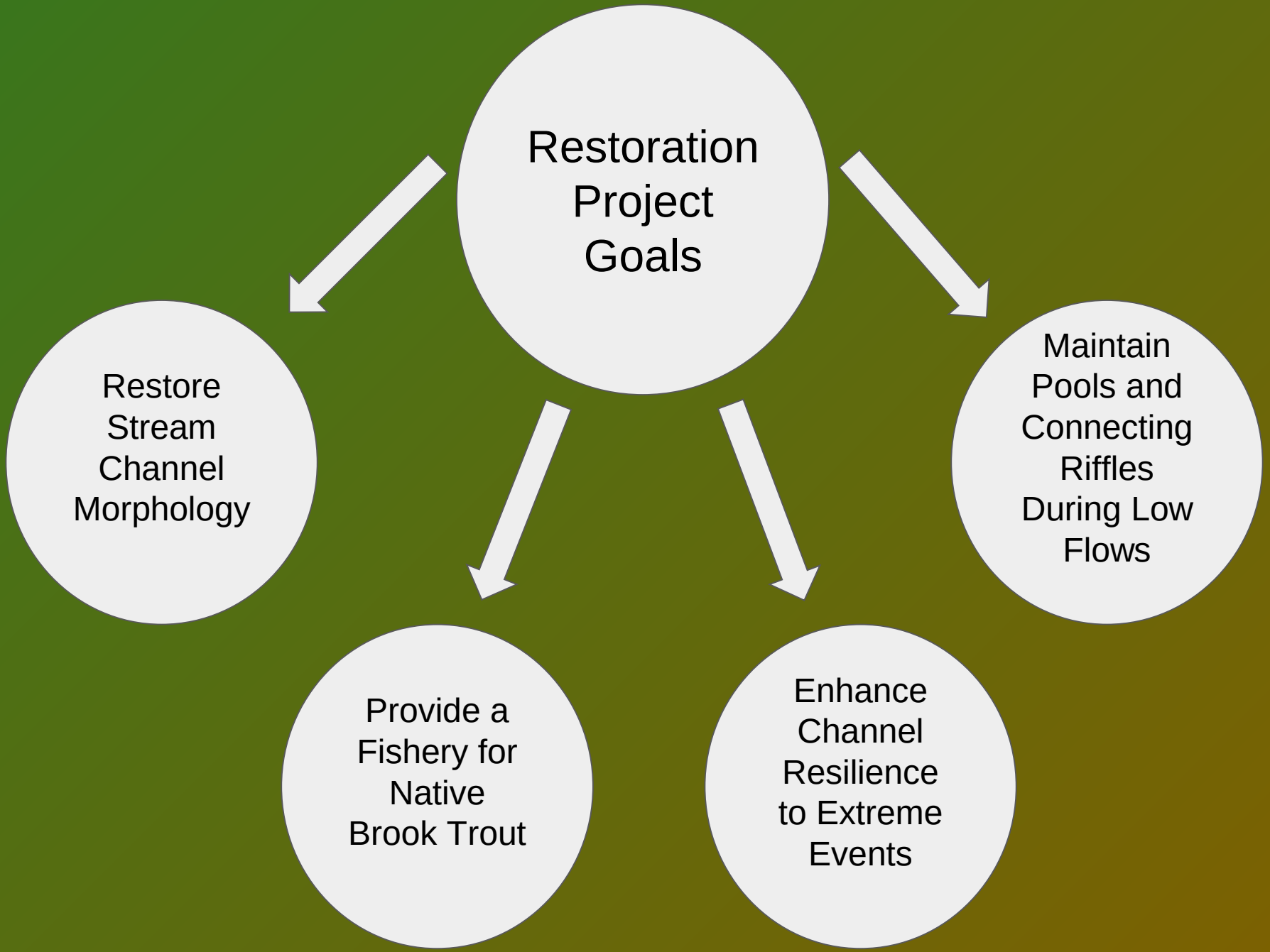

North River Vicinity Map
Legend
Upper North River Watershed
George Washington and Jefferson National Forest
Augusta County
Virginia
Augusta County
N
W
E
S
0
25
50
100 Miles

June 1949 Flood

1959-1965

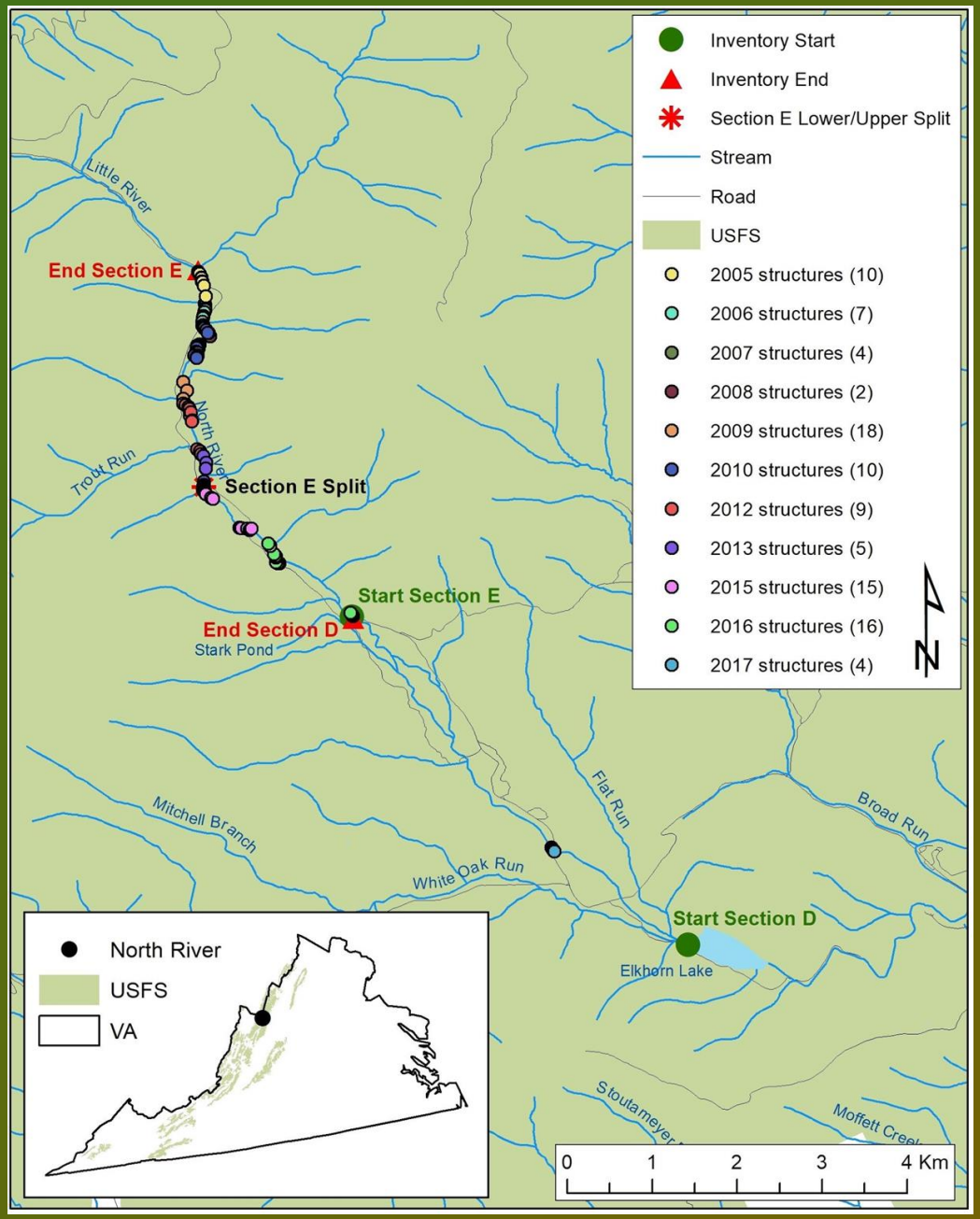
November 1985 Hurricane Juan

Current Restoration Project
2005-2017


Restoration Project Goals
Restore Stream Channel Morphology
Maintain Pools and Connecting Riffles During Low Flows
Provide a Fishery for Native Brook Trout
Enhance Channel Resilience to Extreme Events

North River	2005*	2006	2007	2008	2009	2010	2012	2013	2015	2016	2017	Total
Section D											4	4
Section E Lower									15	16		31
Section E Upper	10	7	4	2	18	10	9	5				65
												100

**2005 structures were installed Aug-Sep 2005, after Jun-Jul 2005 BVET*

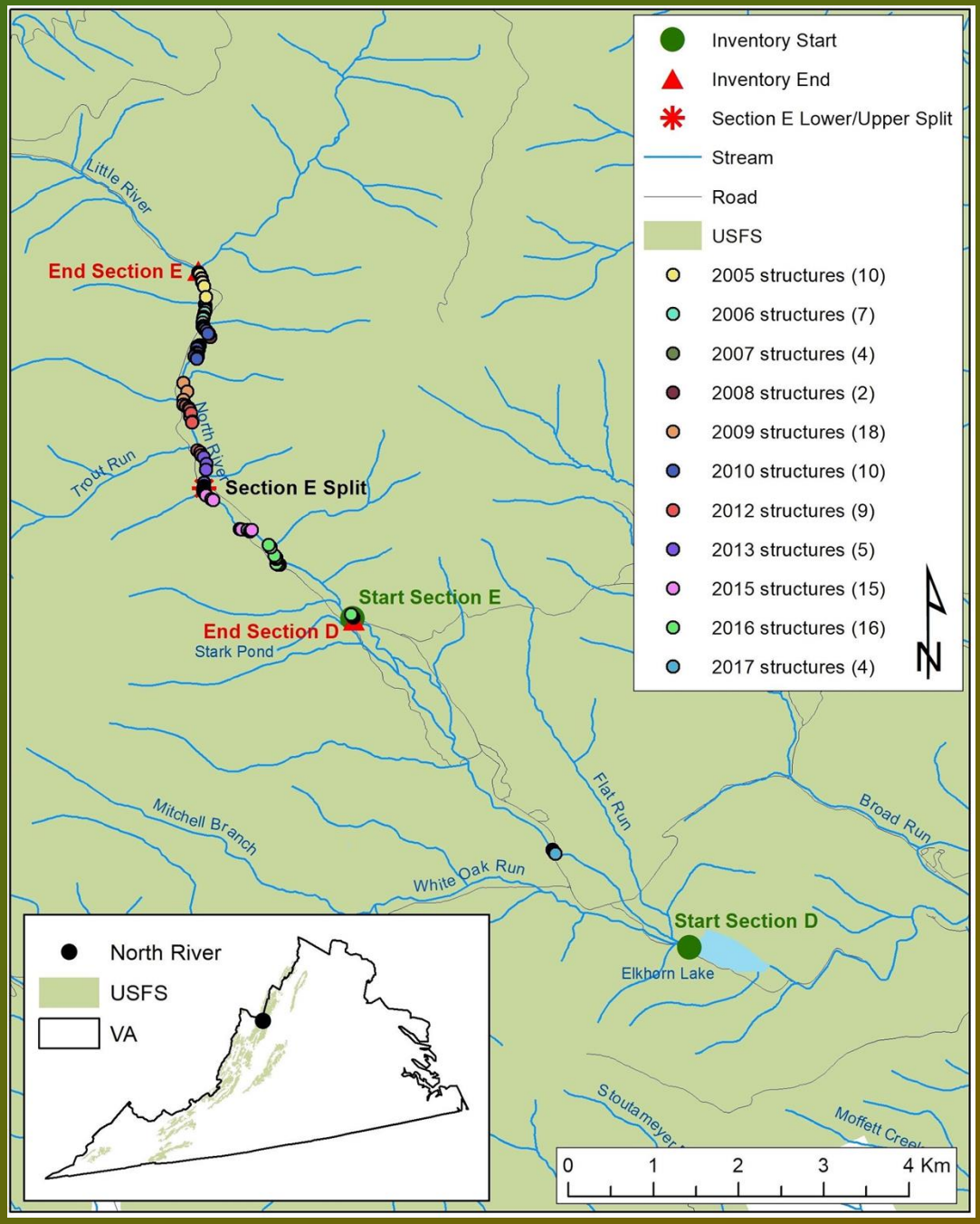

Inventory Start
Inventory End
Section E Lower/Upper Split
Stream
Road
USFS
2005 structures (10)
2006 structures (7)
2007 structures (4)
2008 structures (2)
2009 structures (18)
2010 structures (10)
2012 structures (9)
2013 structures (5)
2015 structures (15)
2016 structures (16)
2017 structures (4)
N
Little River
End Section E
North River
Trout Run
Section E Split
Start Section E
End Section D
Stark Pond
Mitchell Branch
White Oak Run
Flat Run
Broad Run
Start Section D
Elkhorn Lake
Stoutameyer
Moffett Creek
North River
USFS
VA
0
1
2
3
4 Km


2006


2007


2011

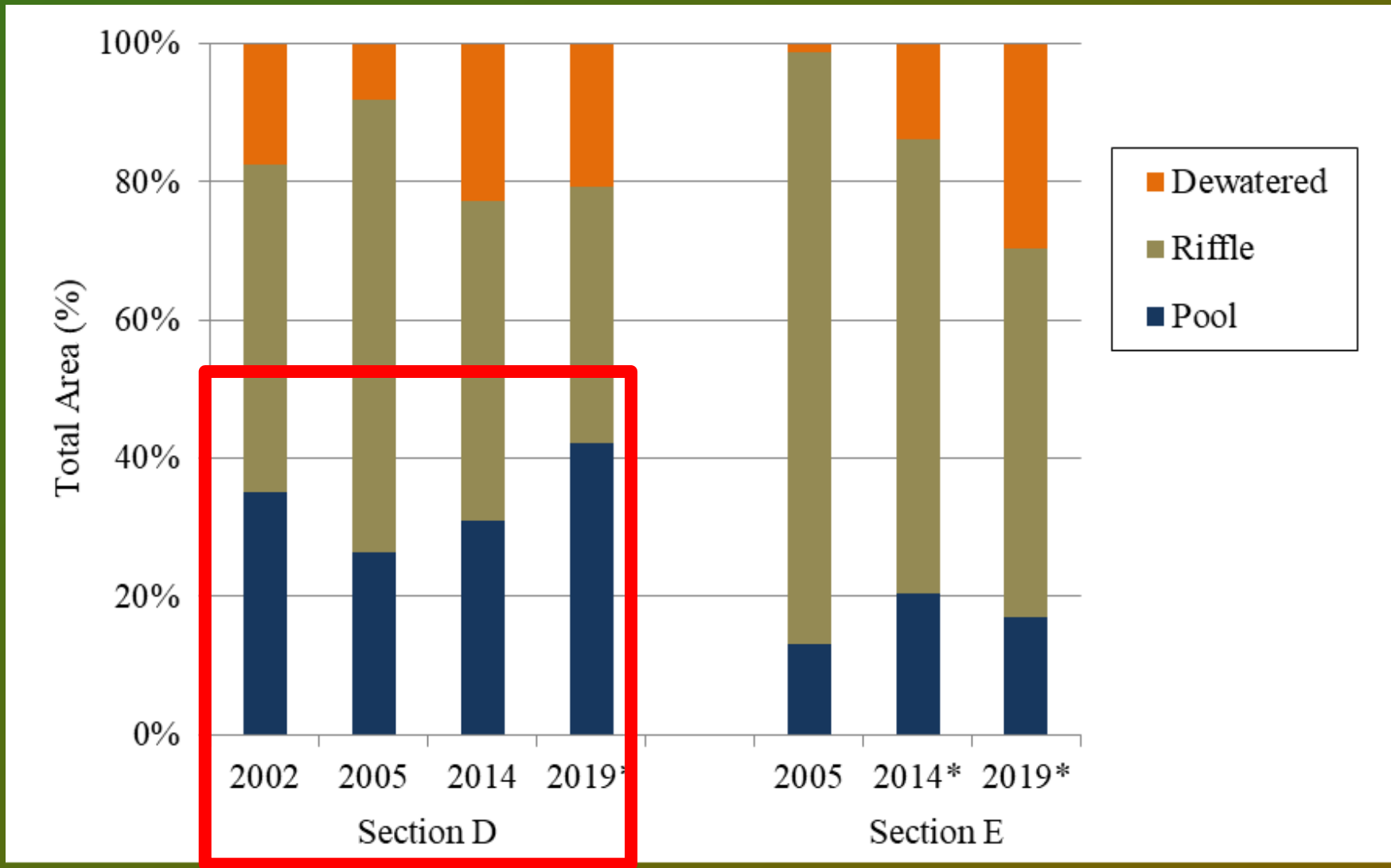
Basinwide Visual Estimation Technique



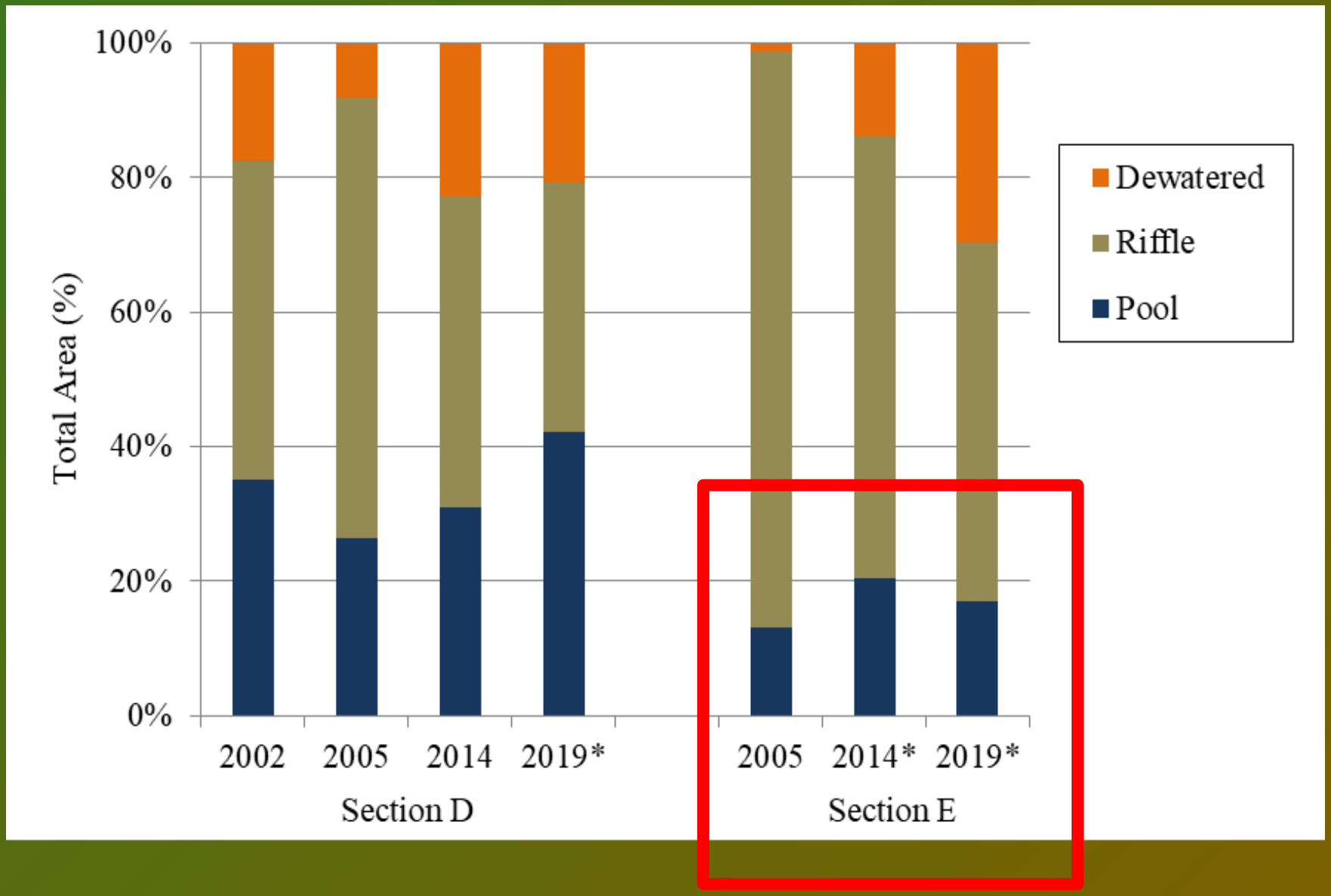
(Dolloff et. al 1993)

	Slow water aka Pools (pools and glides)	Fast water aka Riffles (riffles, runs and cascades)	Dewatered
Distance	x	x	
Estimated Width	x	x	
Maximum Depth	x	x	
Average Depth	x	x	
Dominant Substrate	x	x	
Subdominant Substrate	x	x	
Percent Fines	x	x	
Riffle Crest Height		x	
Large Wood	x	x	x

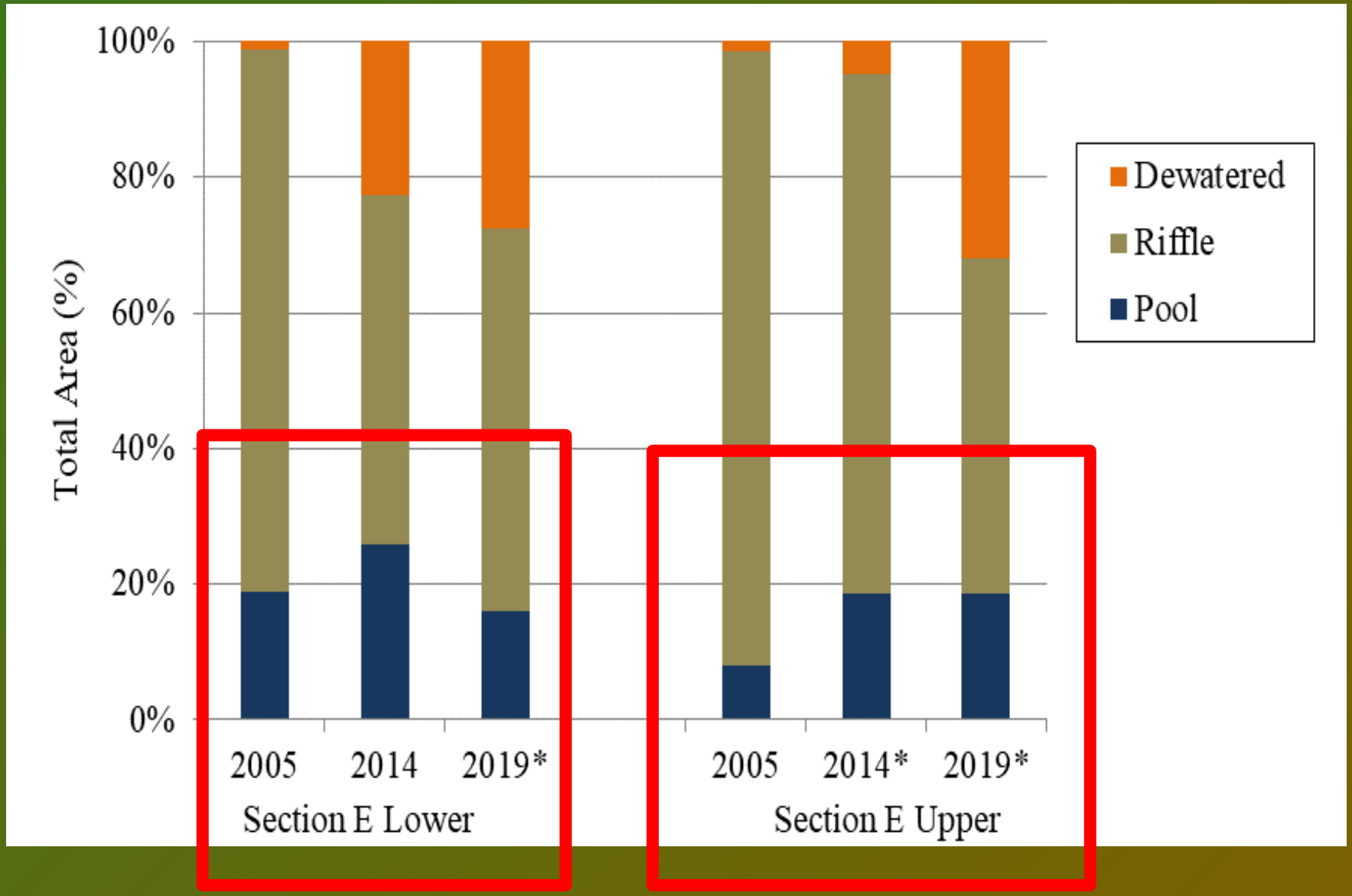
Pool Habitat

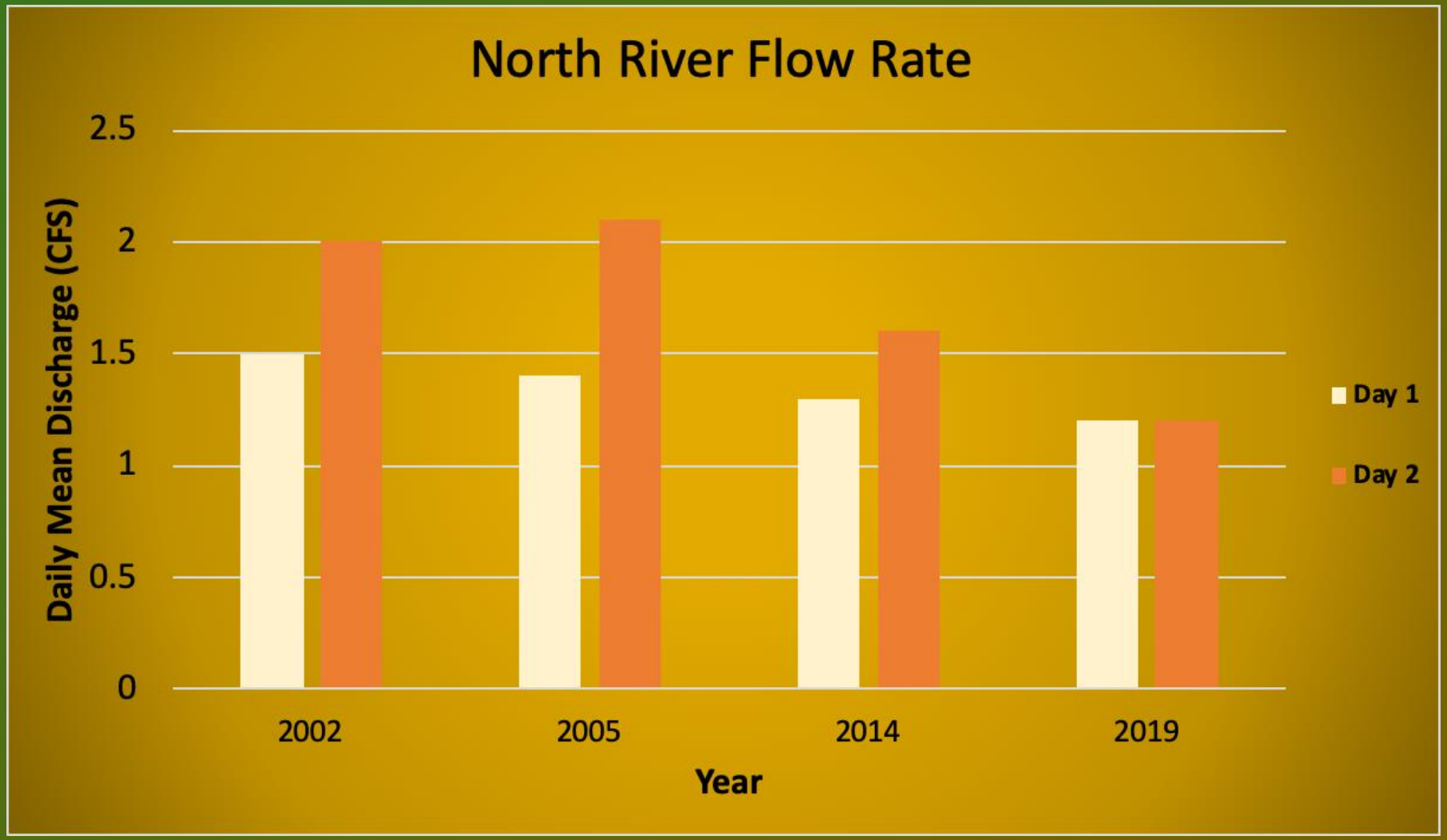


Pool Habitat



Pool Habitat

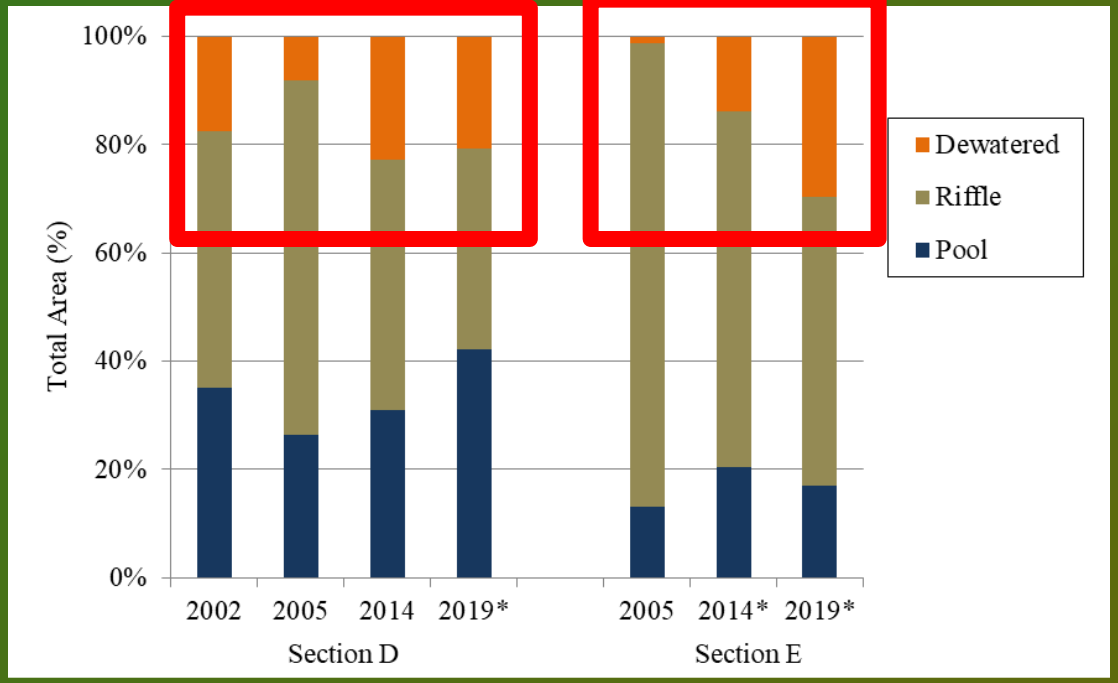


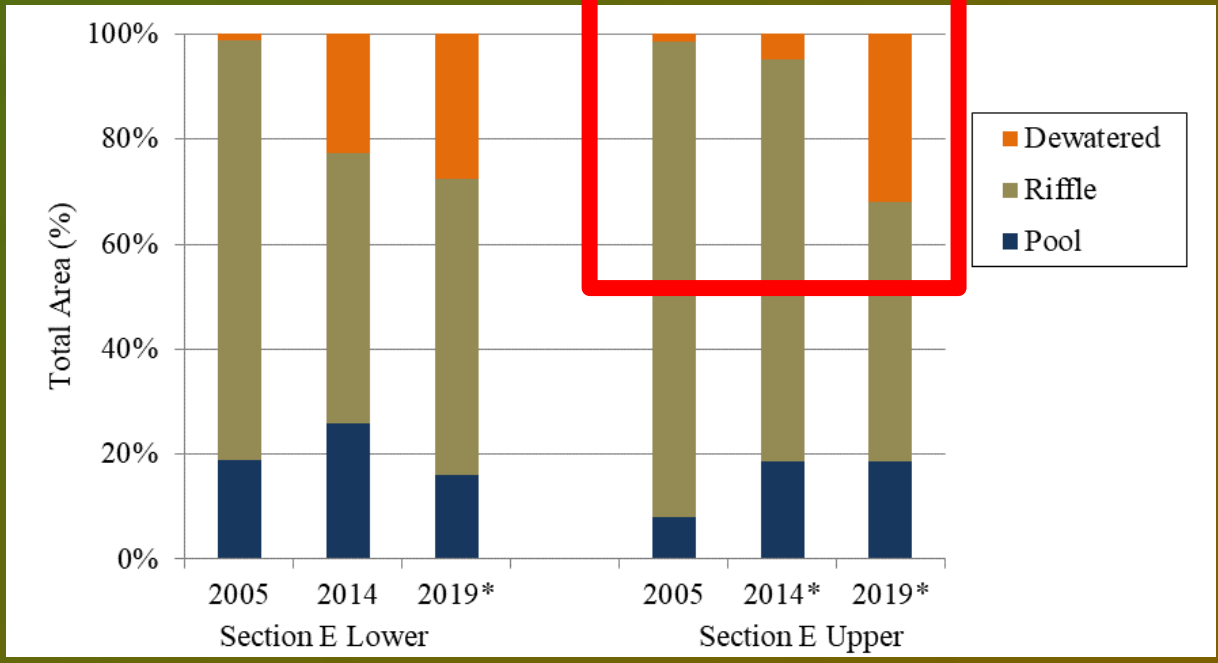


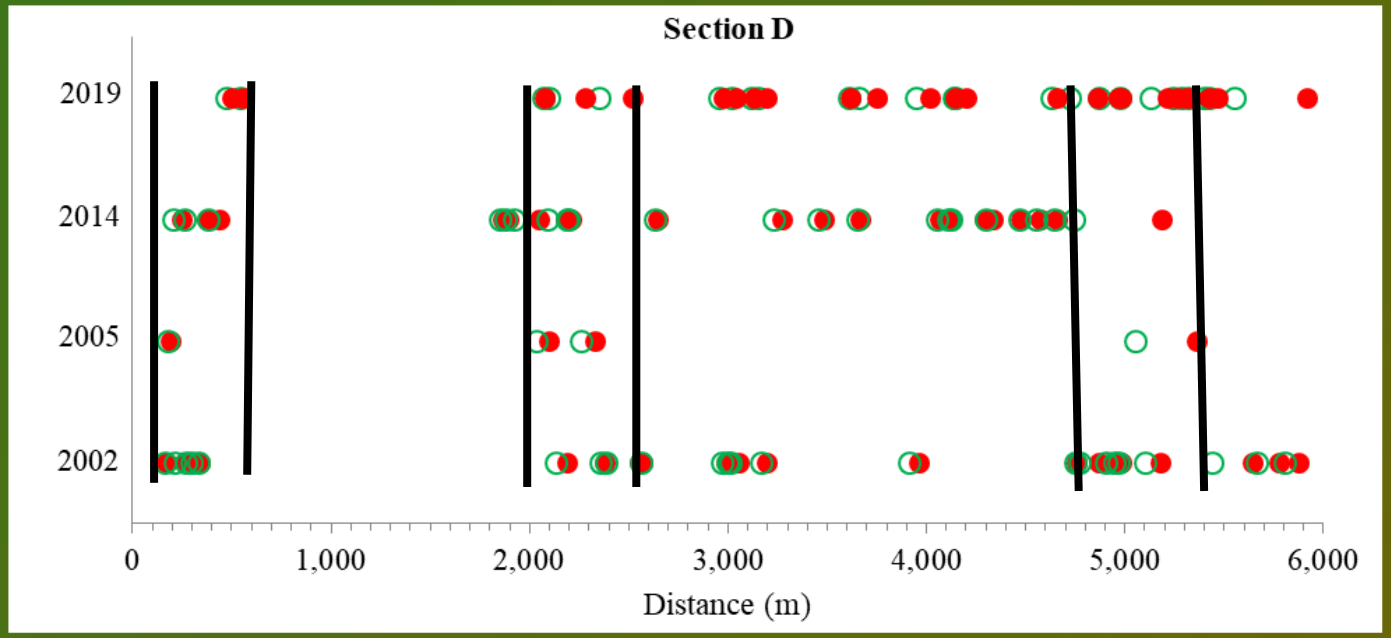
- Data from USGS flow gauge at the North River near Stokesville, VA

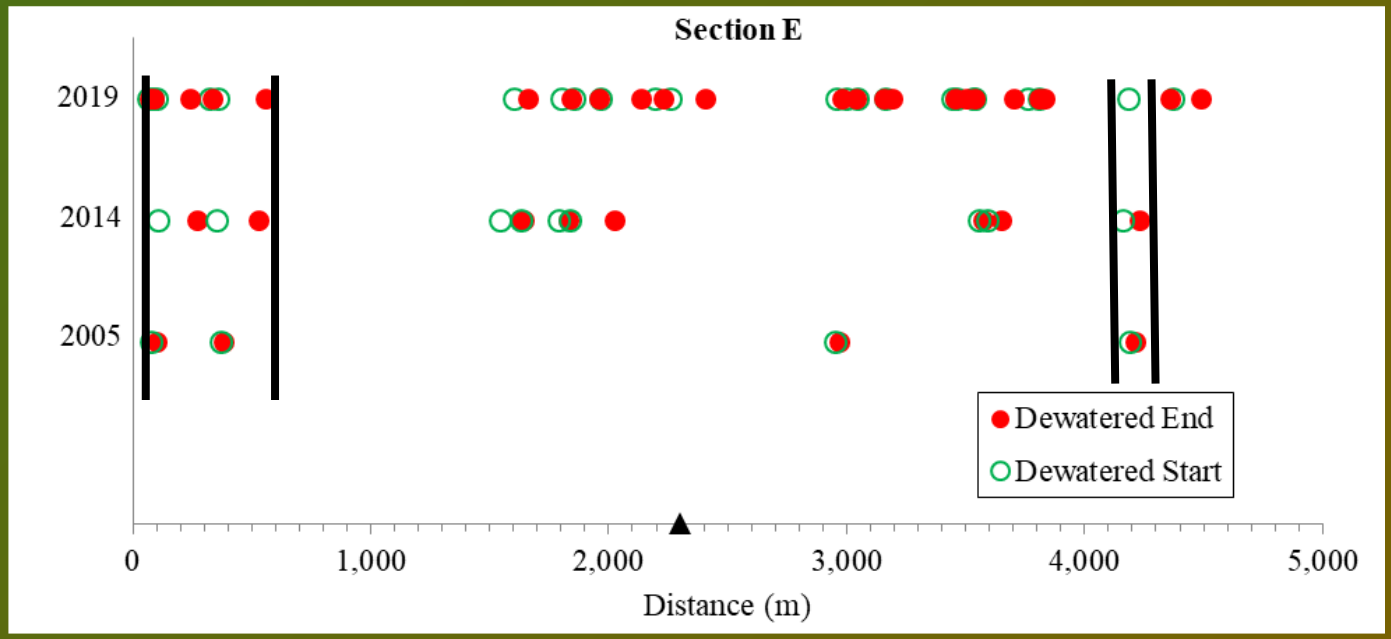
Section E, 2,385m Restoration Structure
2014 vs 2019

Dewatered Channel





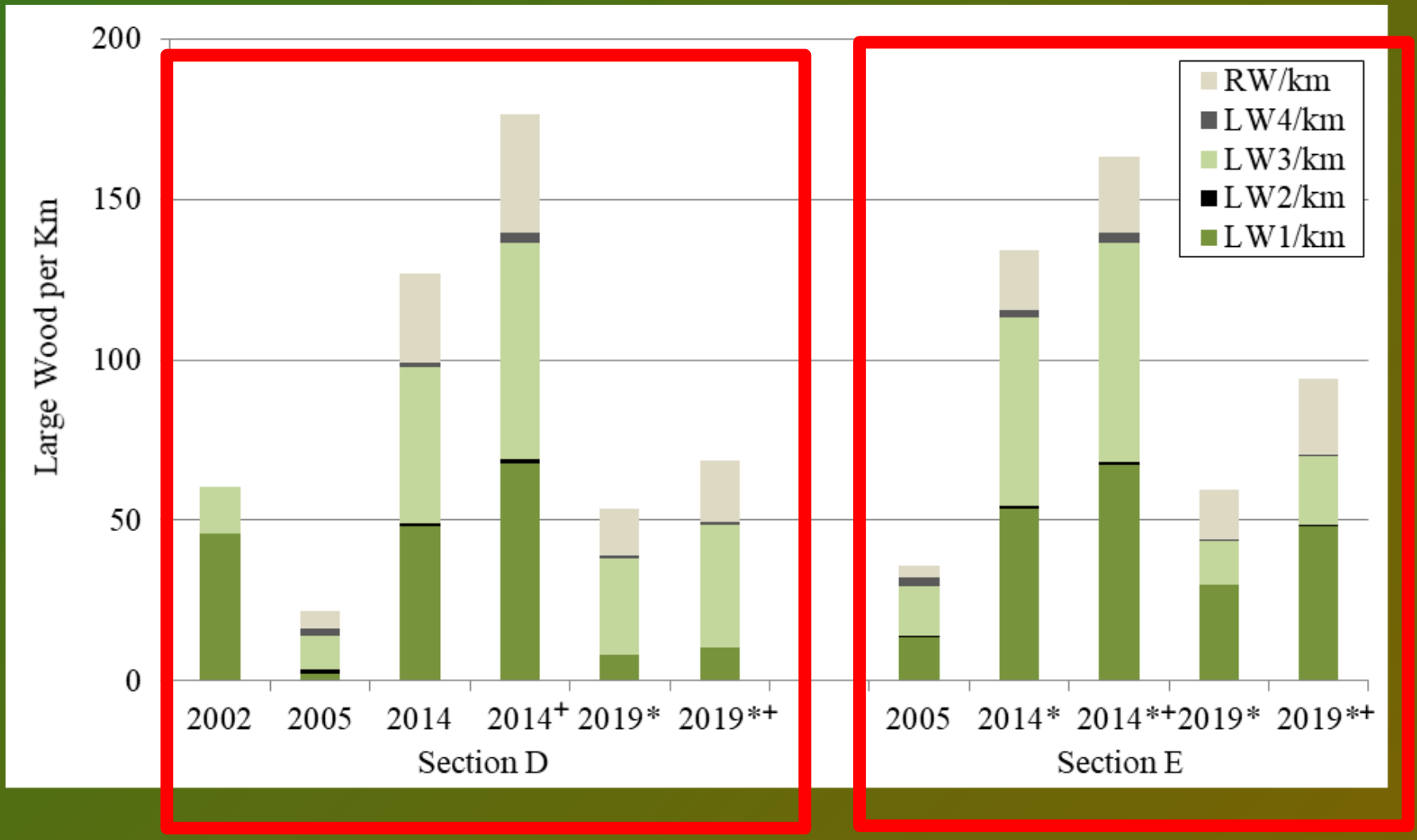

Section D
2019
2014
2005
2002
0
1,000
2,000
3,000
4,000
5,000
6,000
Distance (m)


Section E
2019
2014
2005
0
1,000
2,000
3,000
4,000
5,000
Distance (m)
Dewatered End
Dewatered Start

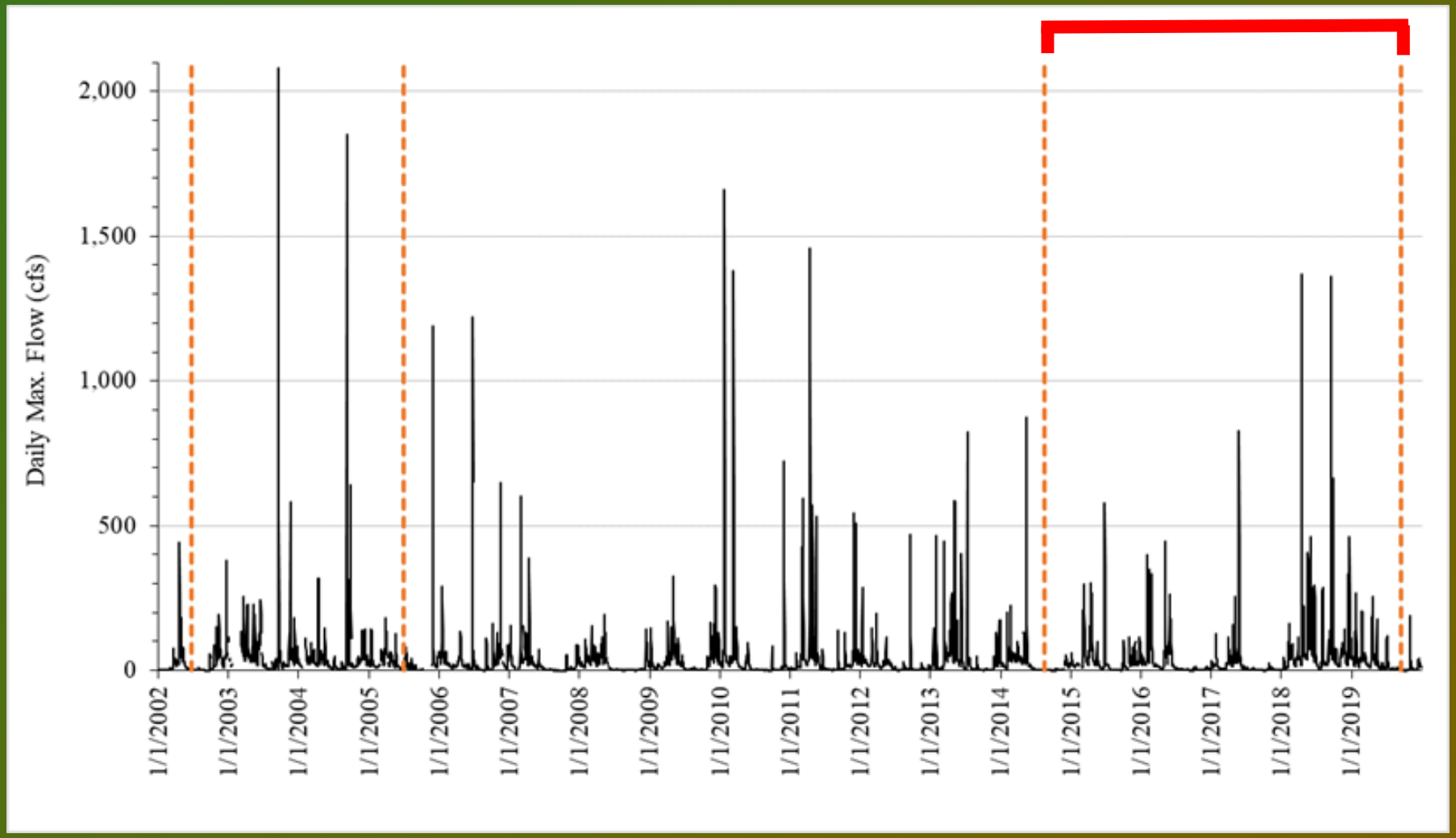
Section E, 2,379m
Bridge 2014 vs 2019

Section E, 4,582m Restoration Structure

2014 vs 2019



- *restoration structures present
- +LW data includes counts within dewatered reaches (this data was not collected in 2002 and 2005)


Daily Max. Flow (cfs)
2,000
1,500
1,000
500
0
1/1/2002
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019

Section E, 4,443m Restoration Structure 2014 vs 2019

Section E, 2630m Restoration Structure
2014 vs 2019

Management Implications

1. Importance of retaining water in smaller mountain streams
2. Further monitoring (habitat and fish)
3. What features work and where

Questions?