

Living Resource Application of 4D Interpolator

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Water Quality Data

- 10 Years Interpolator Outputs: 1991- 2000
3 Parameters, 4 Scenarios*

	No Action	WIP3	1985 Progress	2017 Progress
DO	No Action	WIP3	1985 Progress	2017 Progress
Salinity	Observation	Observation	Observation	Observation
Temperature	Observation	Observation	Observation	Observation

* All scenarios are created by modifying the observations

Habitat Requirements

- Habitat Requirements for Chesapeake Bay Living Resources (1991,EPA)

Life stage:

E=Eggs;

L=Larvae;

J=Juvenile;

A=Adult

	Striped Bass	Blue Crab
DO (mg/L)	>5	>3
Salinity (ppt)	0.5-10 (E) 1-10.5 (L) 0-16 (J)	>20 (L) 0 - 30 (A)
Temperature (°C)	12-23 (E,L) 10-27 (J) 20 - 22 (A)	5 -39

Habitat Volume Days Metric Calculation

- 3 Temporal Scales: Vol days unit (km³ days)

Vol days in the Month i = Monthly Vol * #days of Month i

Vol days in the Season = $\sum_{i \in I, I=\{3,6,9,12\}}^{i+2}$ Vol days in the Month i

Vol days in the Year = $\sum_{i=1}^{12}$ Vol days in the Month i

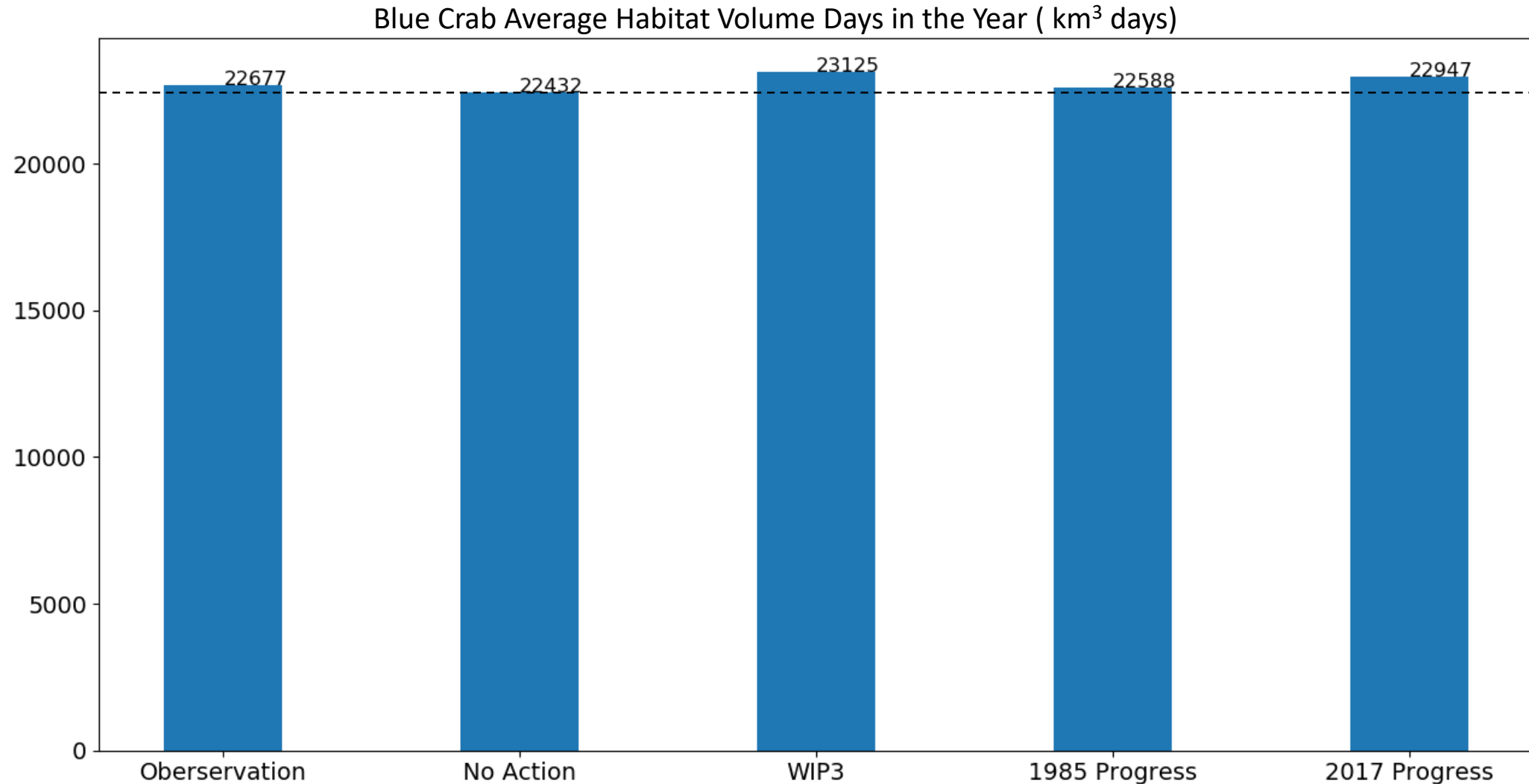
- 2 Spatial Scales:

- Entire Bay

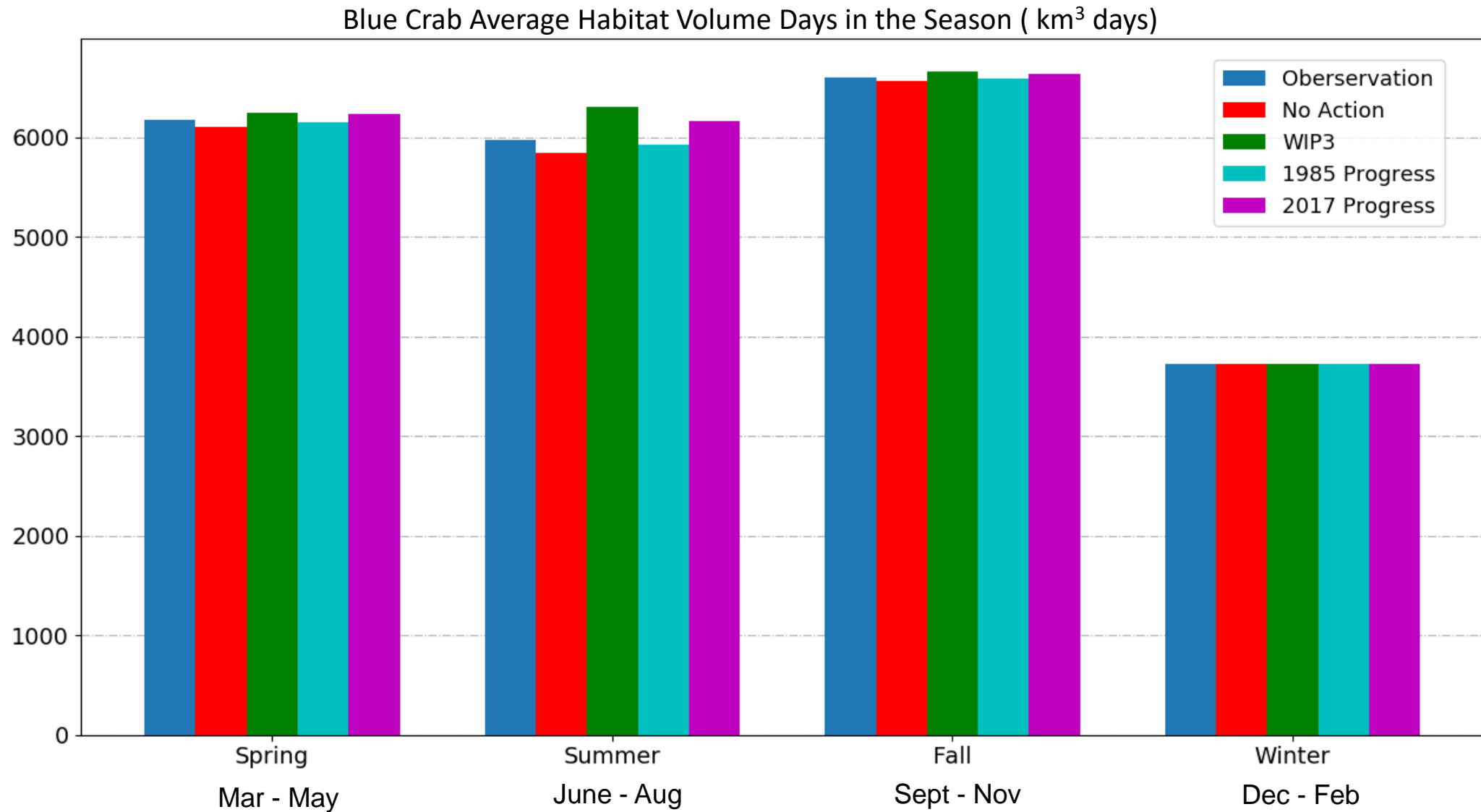
- By Segments

Upper Bay	CB1,CB2
Middle Bay	CB3,CB4,CB5
Lower Bay	CB6,CB7,CB8

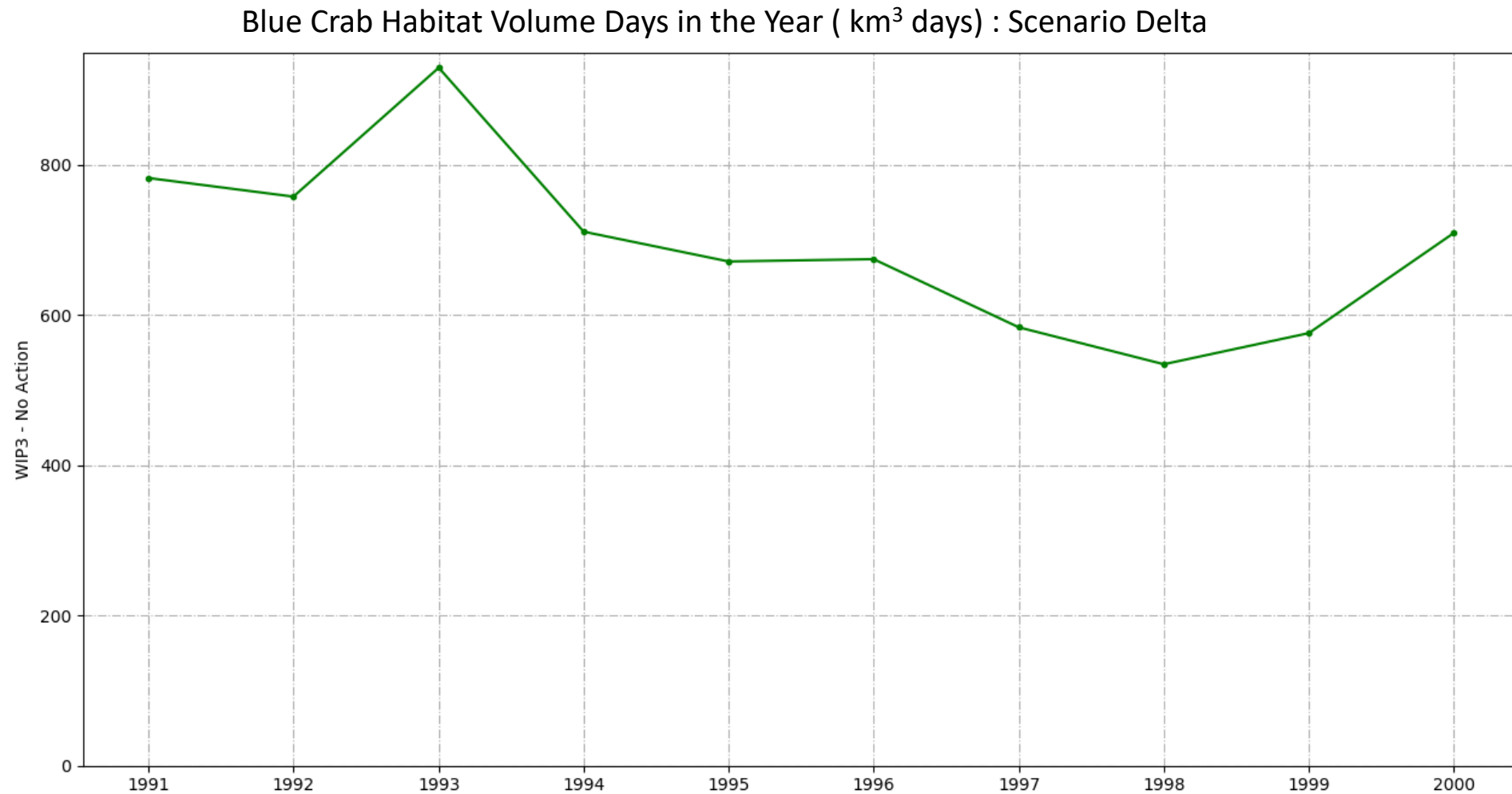
Blue Crab Annual Average (1991-2000)



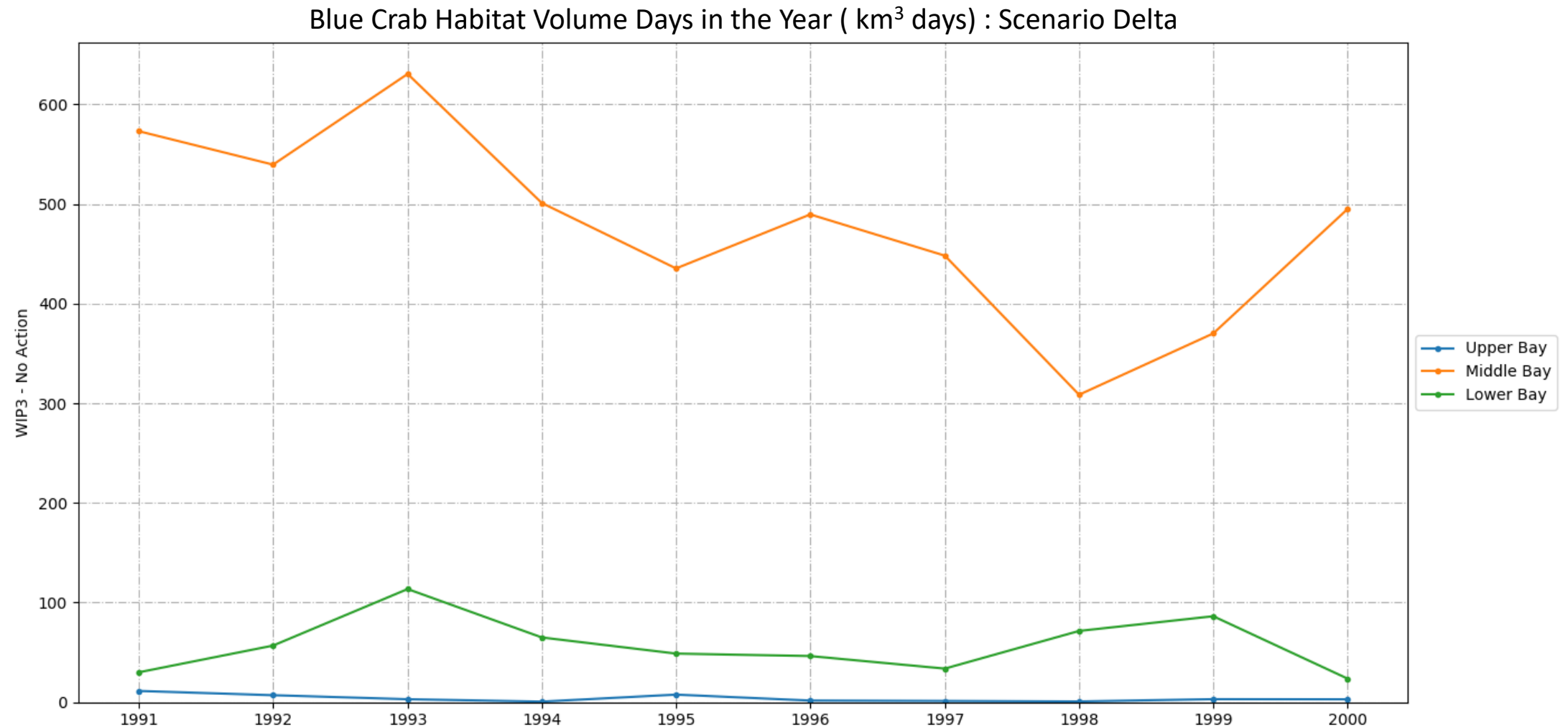
Blue Crab Season Average (1991-2000)



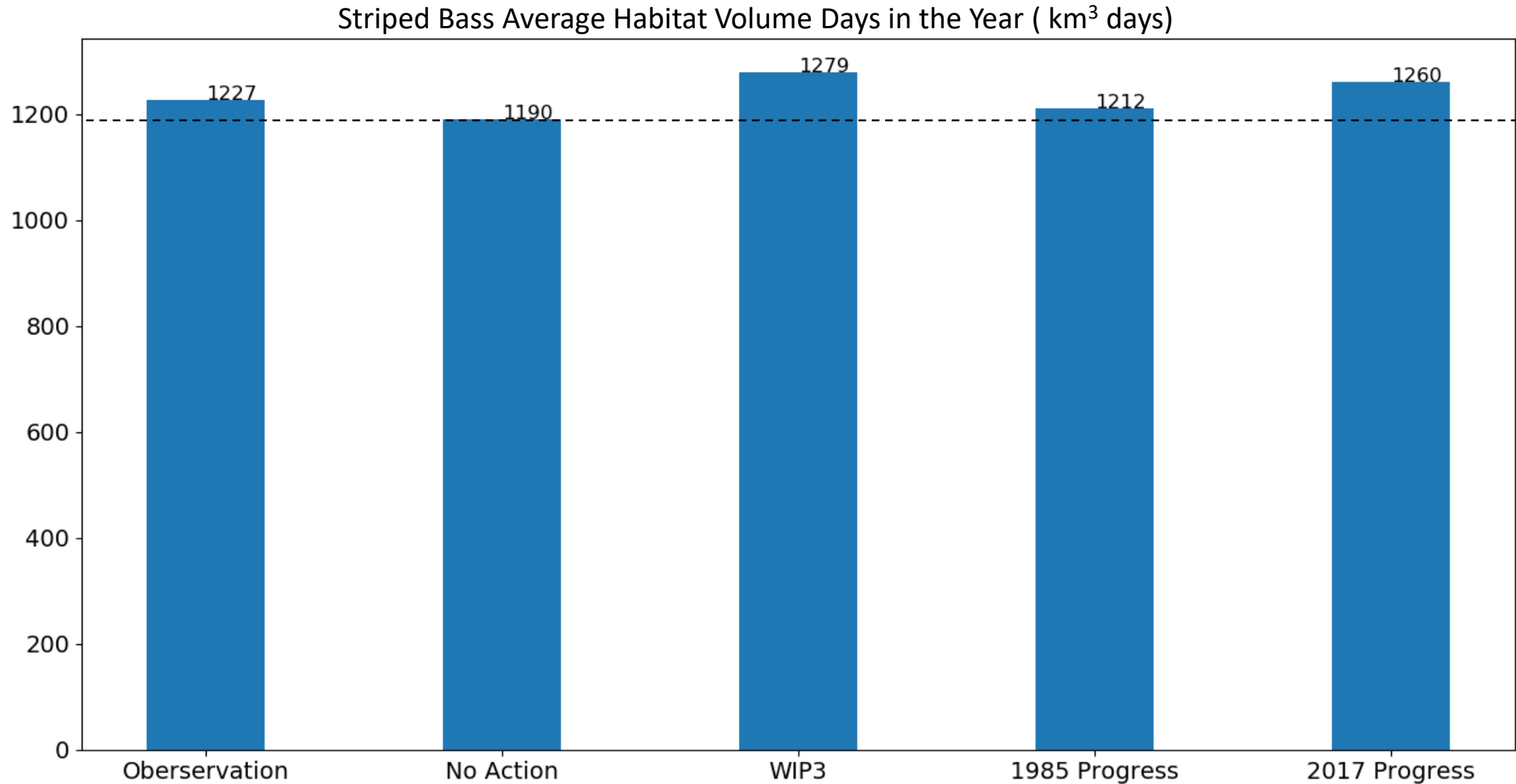
Blue Crab Year - WIP3 vs No Action



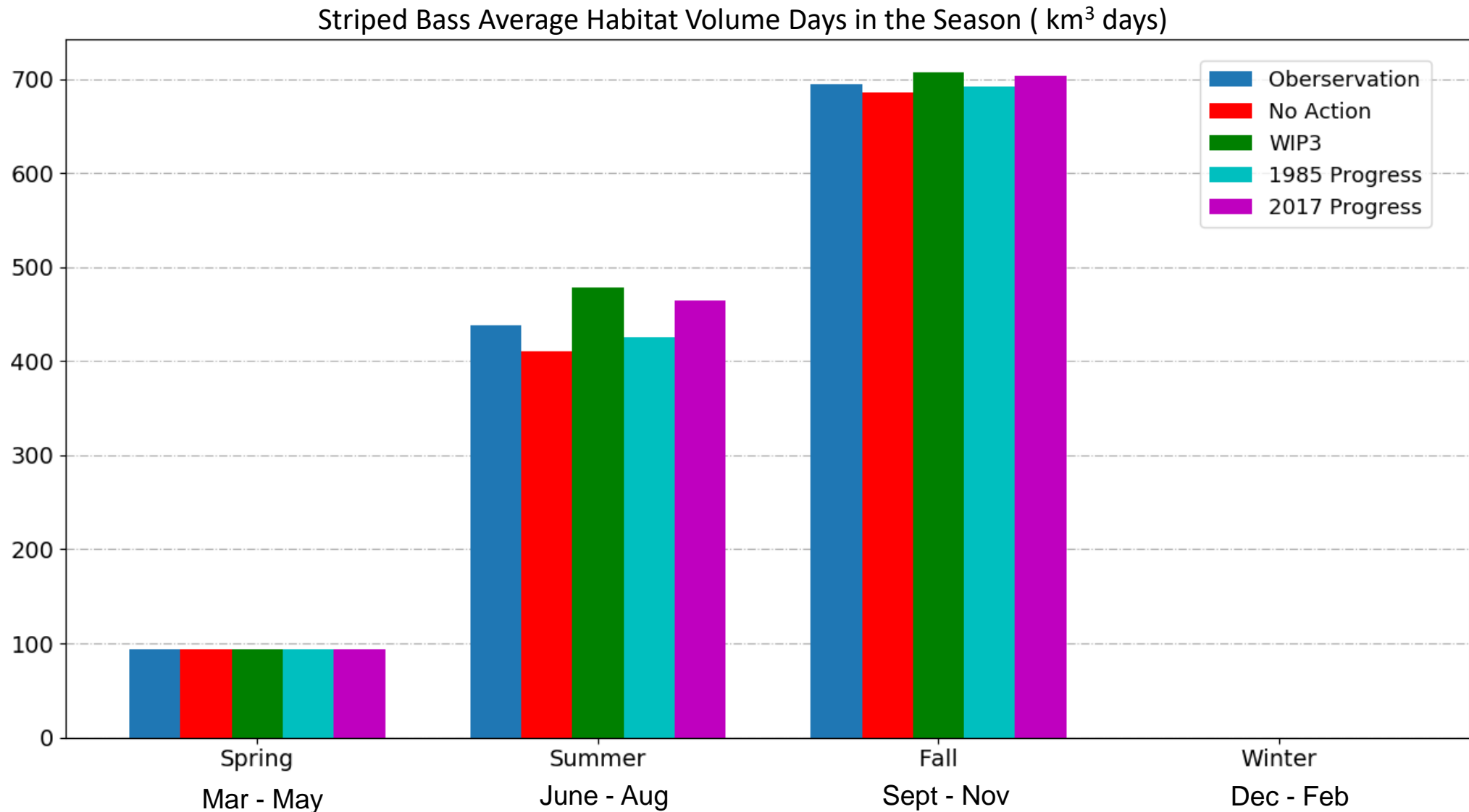
Blue Crab Year by Segment - WIP3 vs No Action



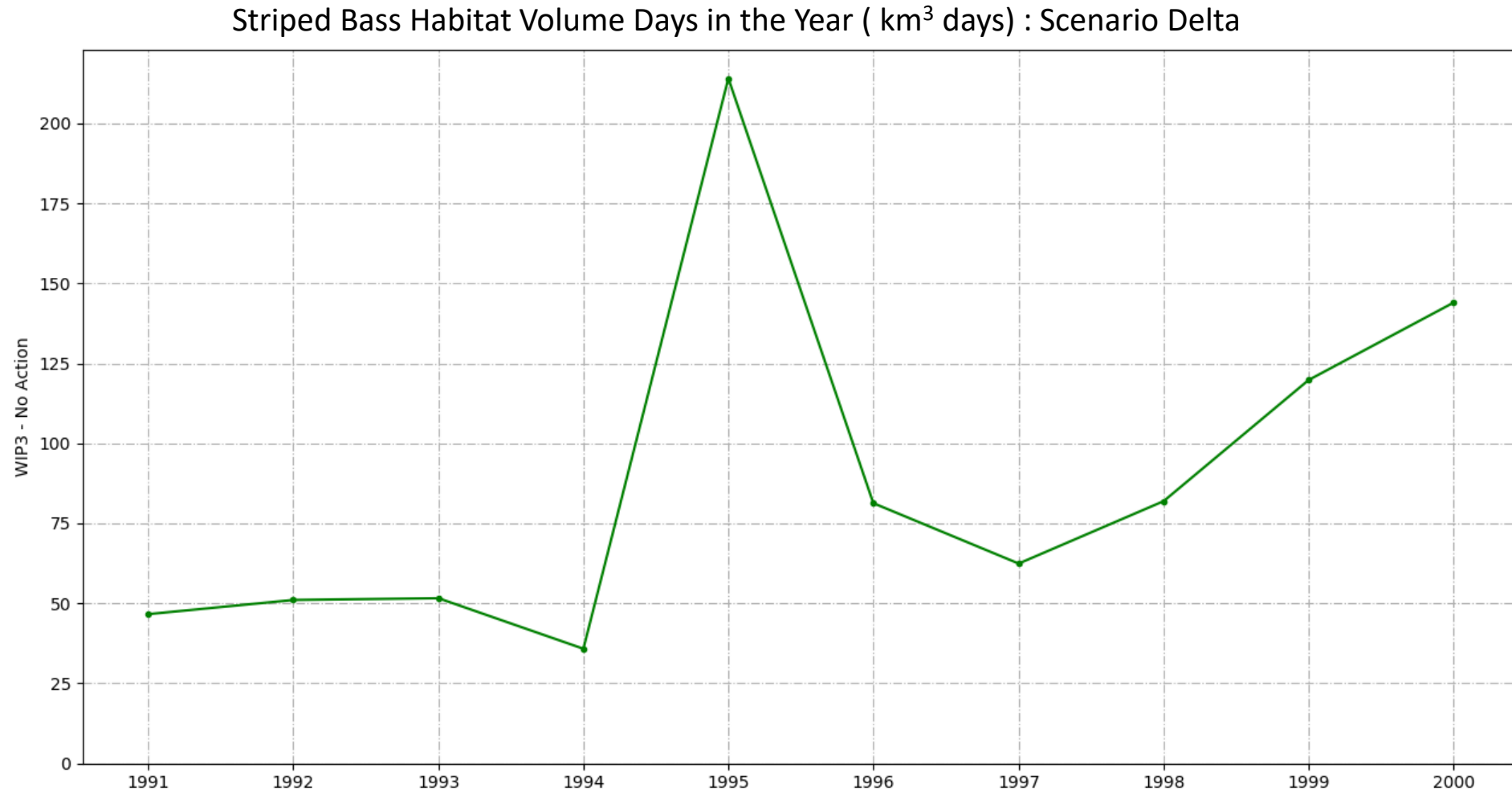
Striped Bass Annual Average (1991-2000)



Striped Bass Season Average (1991-2000)

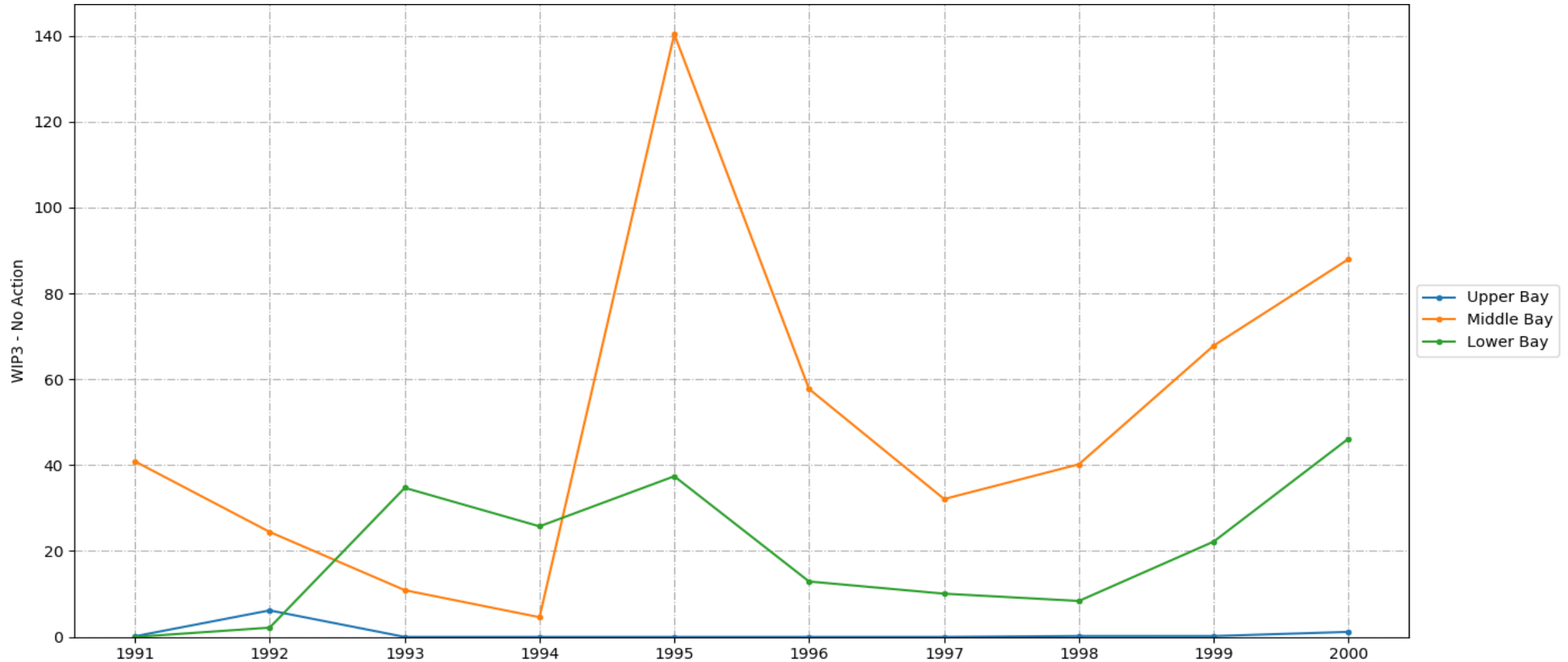


Striped Bass Year - WIP3 vs No Action



Striped Bass Year by Segment - WIP3 vs No Action

Striped Bass Habitat Volume Days in the Year (km³ days) : Scenario Delta



4D Visualization



.EST file

Interpolator output



NumPy



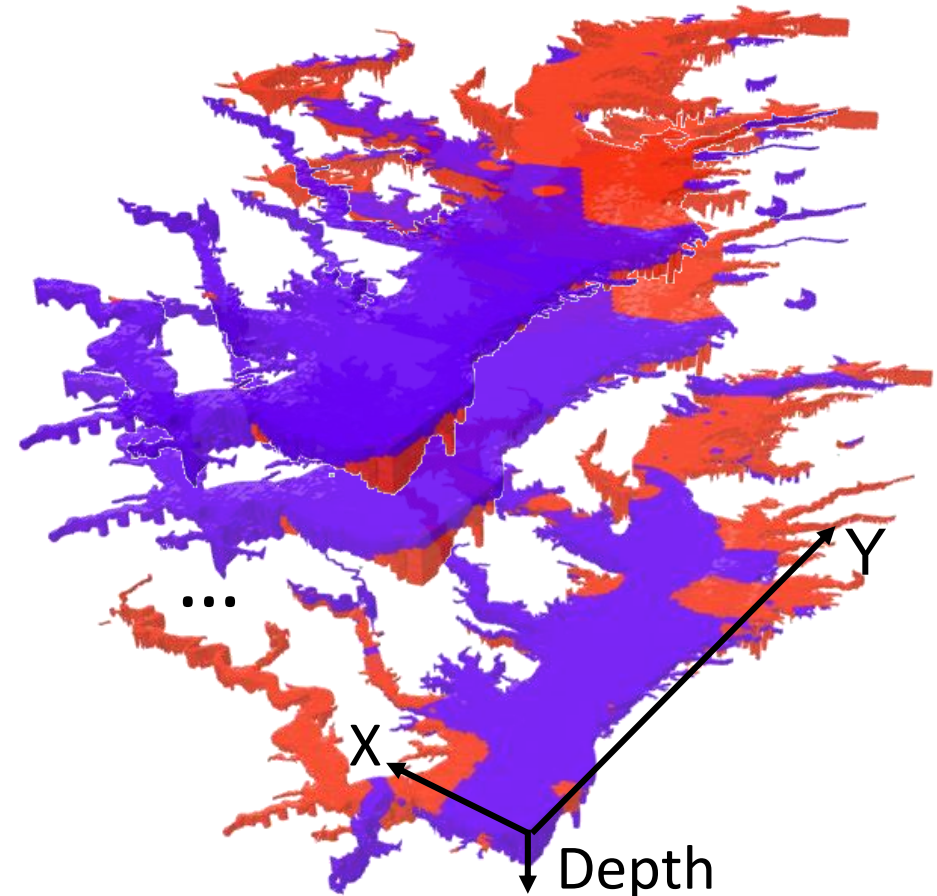
ArcPy

.CSV file

3D Scene layer package

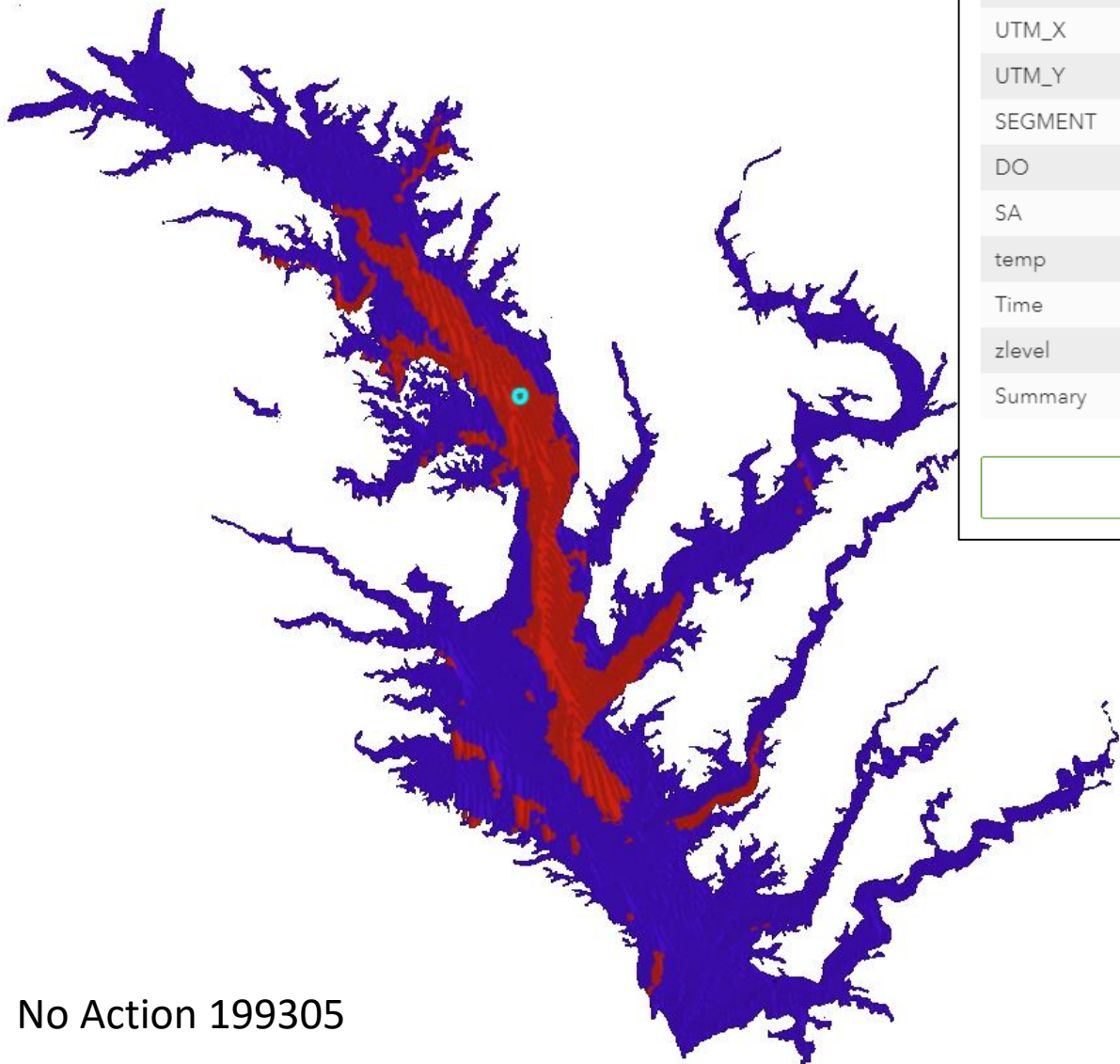
[illegible]

Time



- Measurements: DO, Salinity, Temperature
- Temporal: 10 years monthly (1991 – 2000)

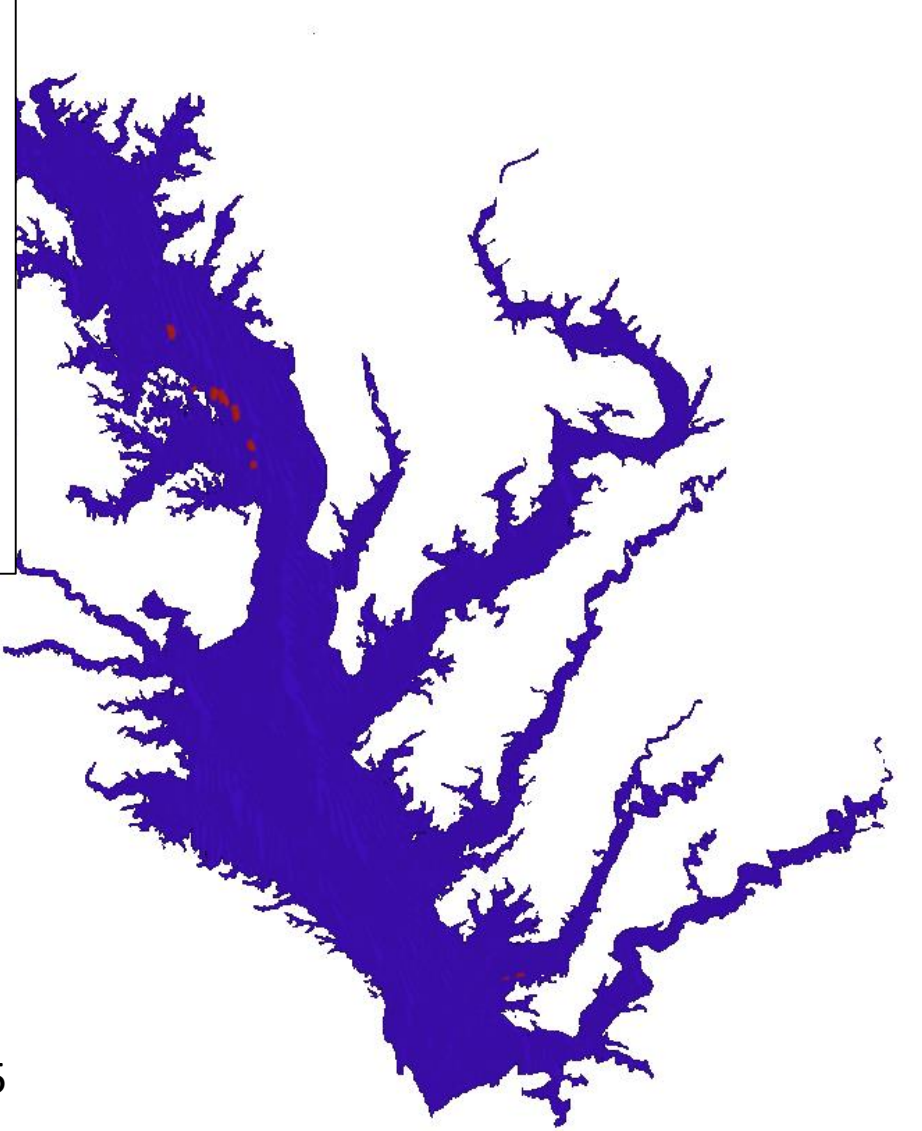
4D Visualization



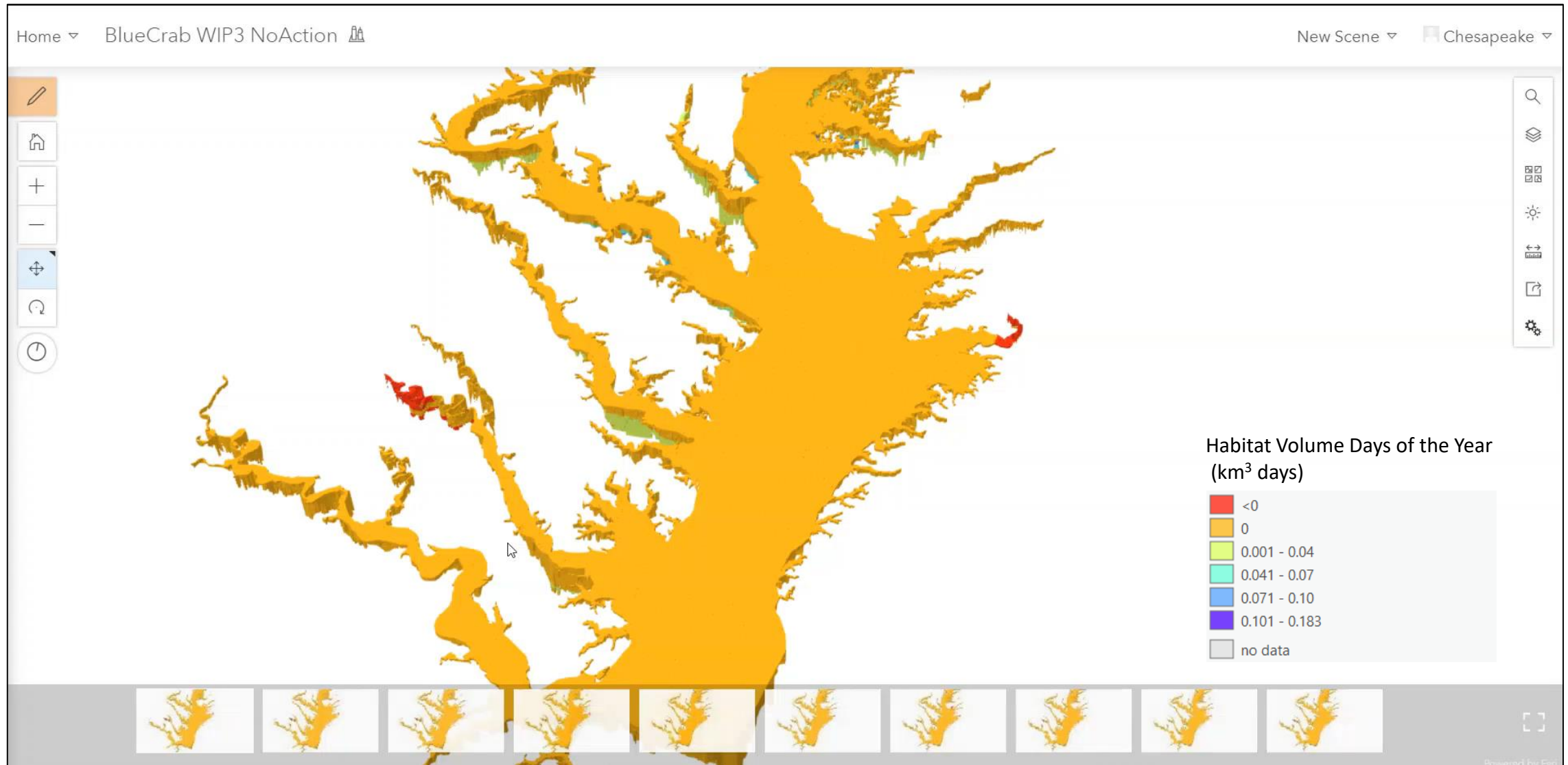
373000

OBJECTID	269
UTM_X	373000
UTM_Y	4285000
SEGMENT	CB4MH
DO	non-habitat
SA	habitat
temp	habitat
Time	199305
zlevel	12
Summary	0

 ZOOM TO



4D Visualization – slice through volume by depth



Live Demo