Susquehanna River Anadromous Fish Restoration Cooperative

Summary of 2019 PFBC Activities

Mission: To protect, conserve, and enhance the Commonwealth's aquatic resources and provide fishing and boating opportunities

Outline

- Van Dyke Overview
- Hatchery Operations & Production
- Biomonitoring
- Plans for 2020

Van Dyke Hatchery - Overview

- Seasonal facility since 1976 (April–June)
- Research culture & tagging techniques
- Intensive Fish Culture
- Staff: (1) Fisheries Biologist, (5) Wage

2019 Hatchery Operations - Eggs

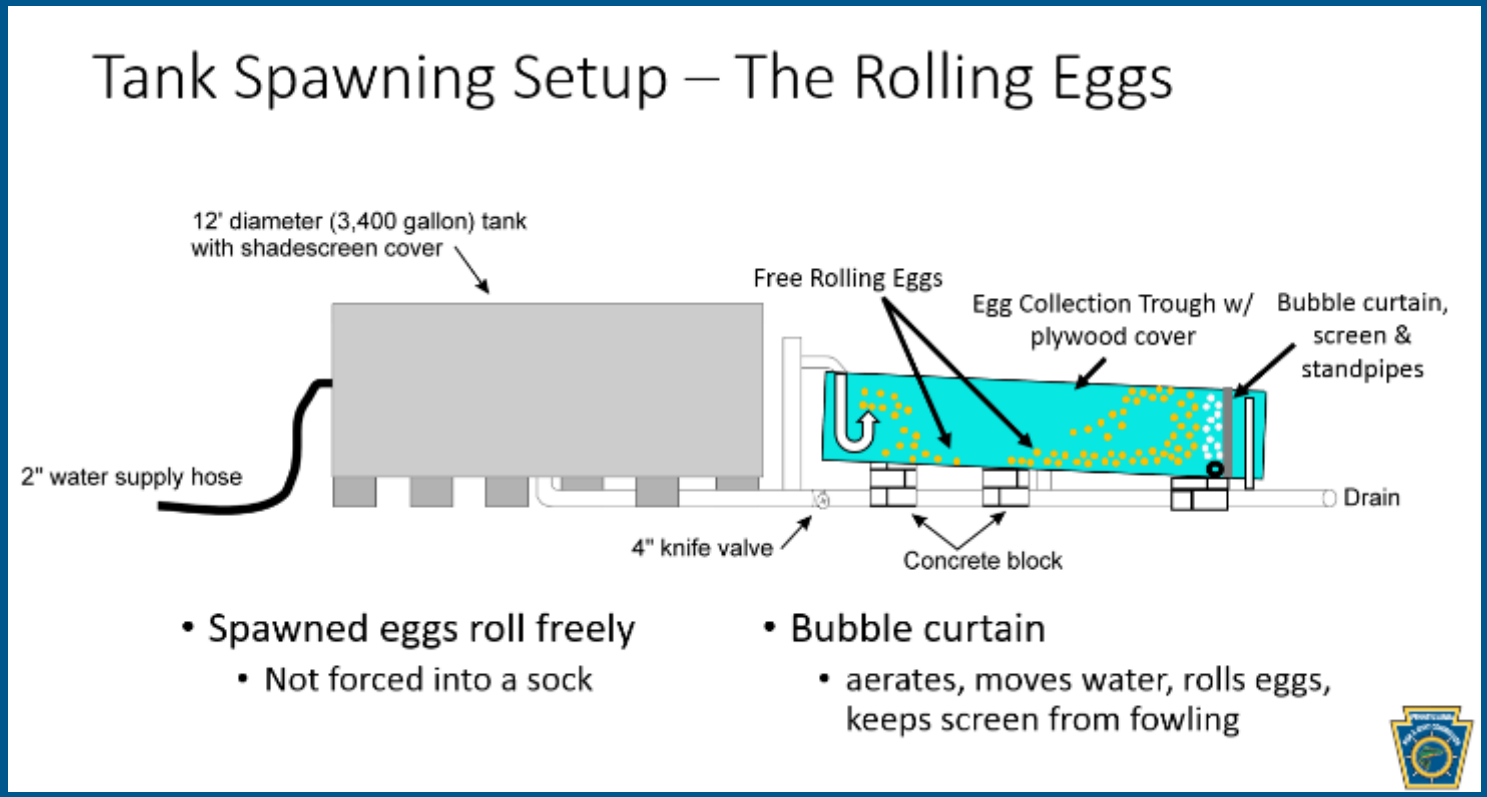
2019 American Shad Egg Shipment Summary					
Egg Source	# Shipments	Volume of Eggs (L)	# Eggs	# Viable Eggs	% Viable
Potomac River, Strip Spawn - USFWS	1	31.8	1,424,675	426,130	29.9%
Susquehanna R, Tank Spawn - Normandeau	4	33.2	1,472,226	665,171	45.2%
Delaware River, Strip Spawn - PFBC	-	-	-	-	-
Total	**5**	**65.0**	**2,896,901**	**1,091,301**	**37.7%**

- Potomac
  - 1 shipment, 4/30
  - 426,000 live eggs
  - 29.9% Viability
  - Thanks to FWS & MDNR
- Susquehanna
  - 4 successful trials, 5/4-5/10 (5/31 trial discarded)
  - 665,000 live eggs
  - 45.2% Viability (24.4% - 73.9%)
  - High flows (May 7&15): increase temps, decrease catch & condition

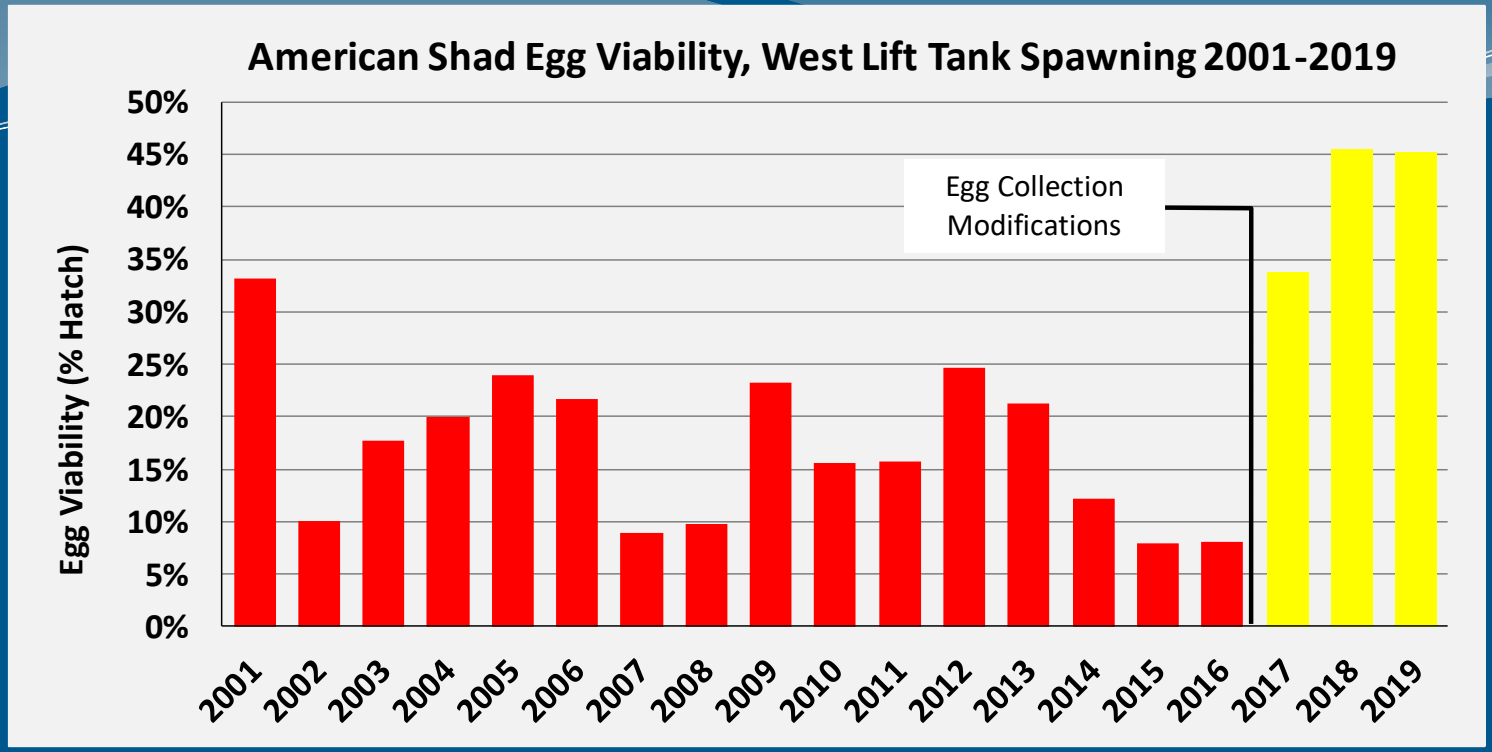
- Delaware
  - Zero shipments – First time
  - High water during operations
  - Poor catch – few ripe, fewer males

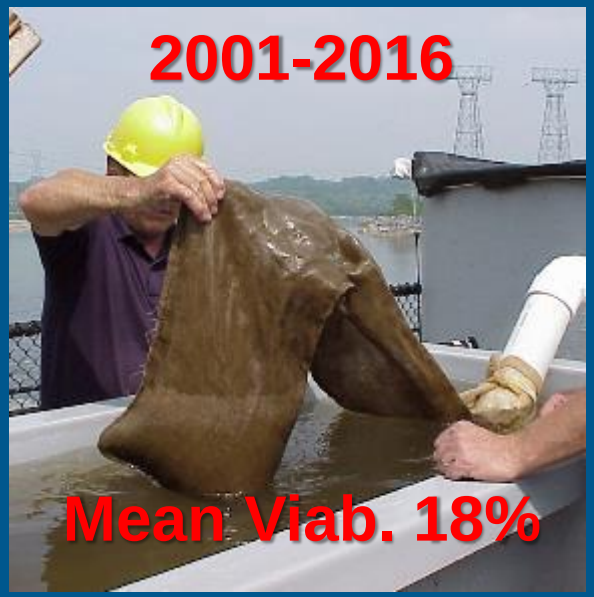
2019 Hatchery Operations - Eggs

- WFL Tank Spawning Improvements (2017-2019)

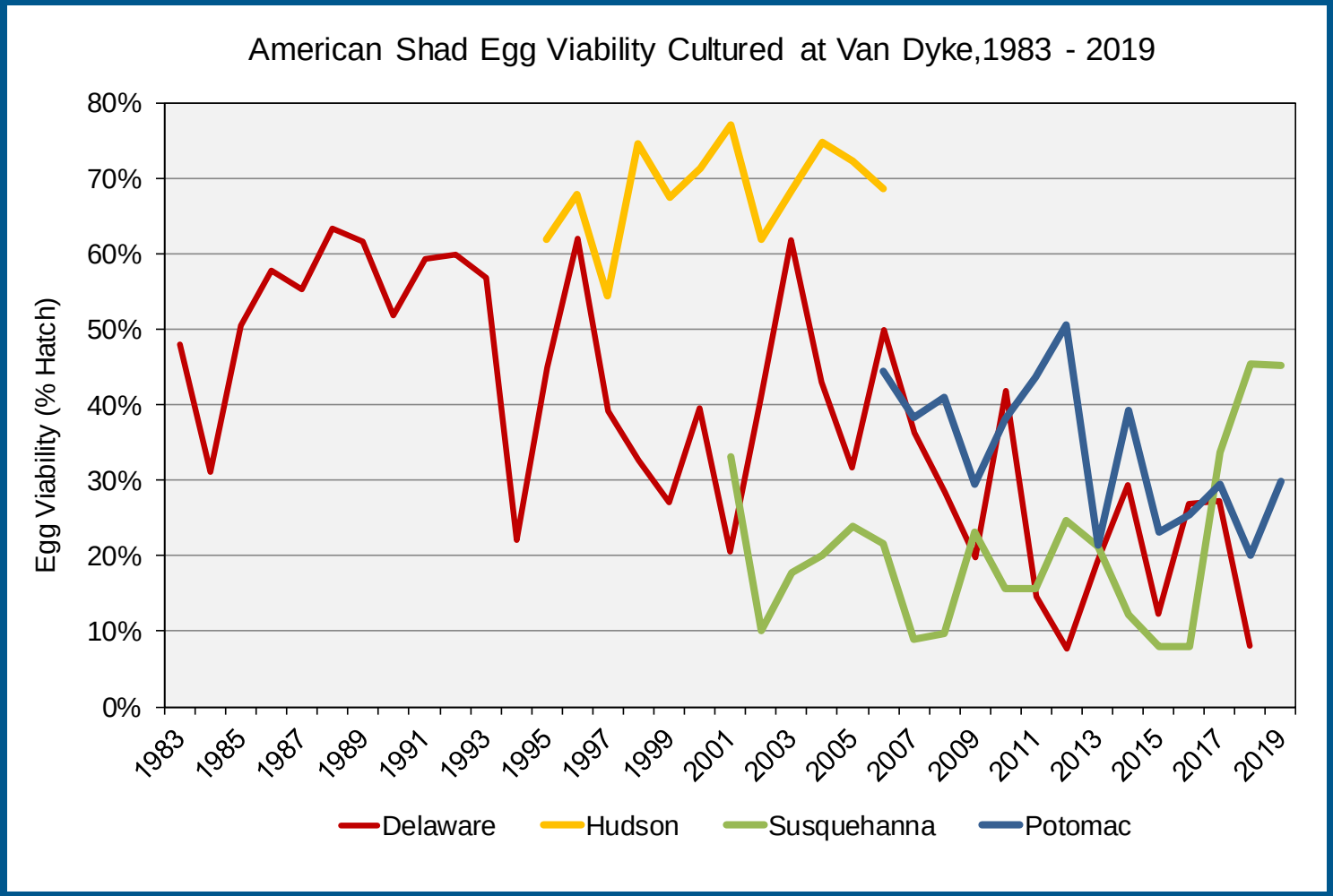


Modifications to plumbing, egg collection & flow


American Shad Egg Viability, West Lift Tank Spawning 2001-2019
Egg Viability (% Hatch)
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Egg Collection Modifications
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019


2001-2016
Mean Viab. 18%


2017-2019
Mean Viab. 40%

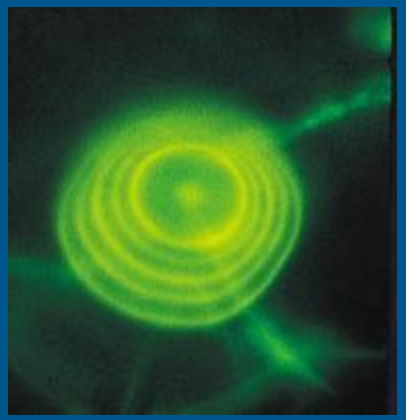

American Shad Egg Viability Cultured at Van Dyke,1983 - 2019
Egg Viability (% Hatch)
80%
70%
60%
50%
40%
30%
20%
10%
0%
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
Delaware
Hudson
Susquehanna
Potomac

2019 Hatchery Operations - OTC

- OTC Tag Retention

2019 OTC Tag Retention Analysis

River Basin	OTC Tags (d)	Culture Tank	Stocking Location	Egg Source	# Sample	QA/QC Tag Retention (%)
Susquehanna						
	3,9	A1	Juniata River Raystown Branch	Potomac	30	100
	3,9	A2	Juniata River Raystown Branch	Potomac	30	100
	3,4,9	A3	Juniata River Raystown Branch	Susquehanna	30	100
	3,4,9	A4	Juniata River Raystown Branch	Susquehanna	30	100
	3,4,9	B1	Juniata River Raystown Branch	Susquehanna	30	100
	3,4,9	B2	Juniata River Raystown Branch	Susquehanna	30	100



2019 Hatchery Operations - Stocking

2019 Susquehanna Basin American Shad Fry Stocking Summary

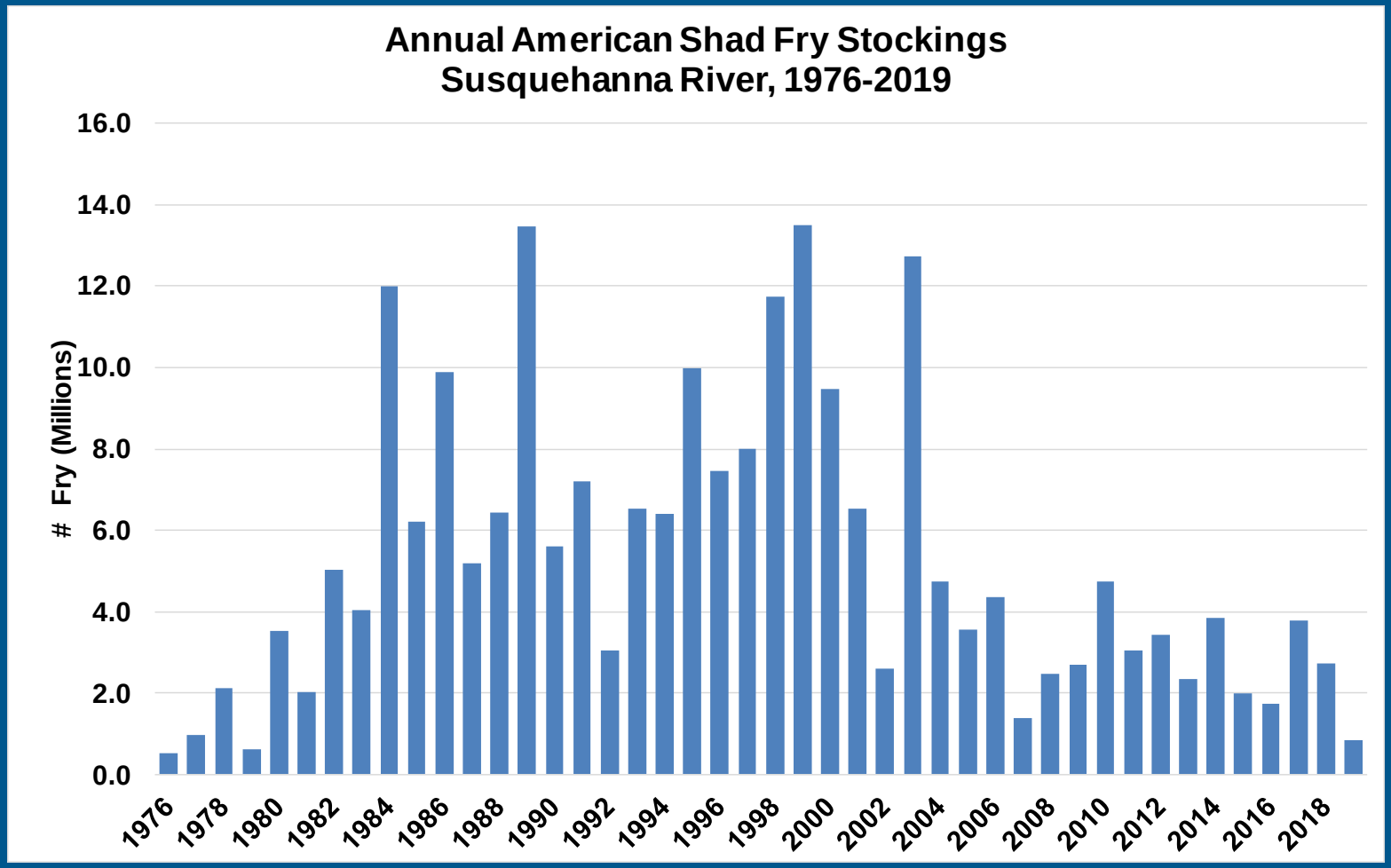
Stocking Date	Culture Tank	OTC Tags (d)	Stocking Location	Egg Source	Age at Stocking (d)	# Fry
6/3	A1	3,9	Juniata River Raystown Branch	Potomac	26	150,000
6/3	A2	3,9	Juniata River Raystown Branch	Potomac	26	125,000
6/4	A3	3,4,9	Juniata River Raystown Branch	Susquehanna	23	165,000
6/4	A4	3,4,9	Juniata River Raystown Branch	Susquehanna	21	203,000
6/5	B1	3,4,9	Juniata River Raystown Branch	Susquehanna	21	100,000
6/5	B2	3,4,9	Juniata River Raystown Branch	Susquehanna	19	89,000
				Susquehanna Basin Total		***832,000***

2019 Hatchery Operations - Fry

- Hatchery Survival: Hatch to Stocking

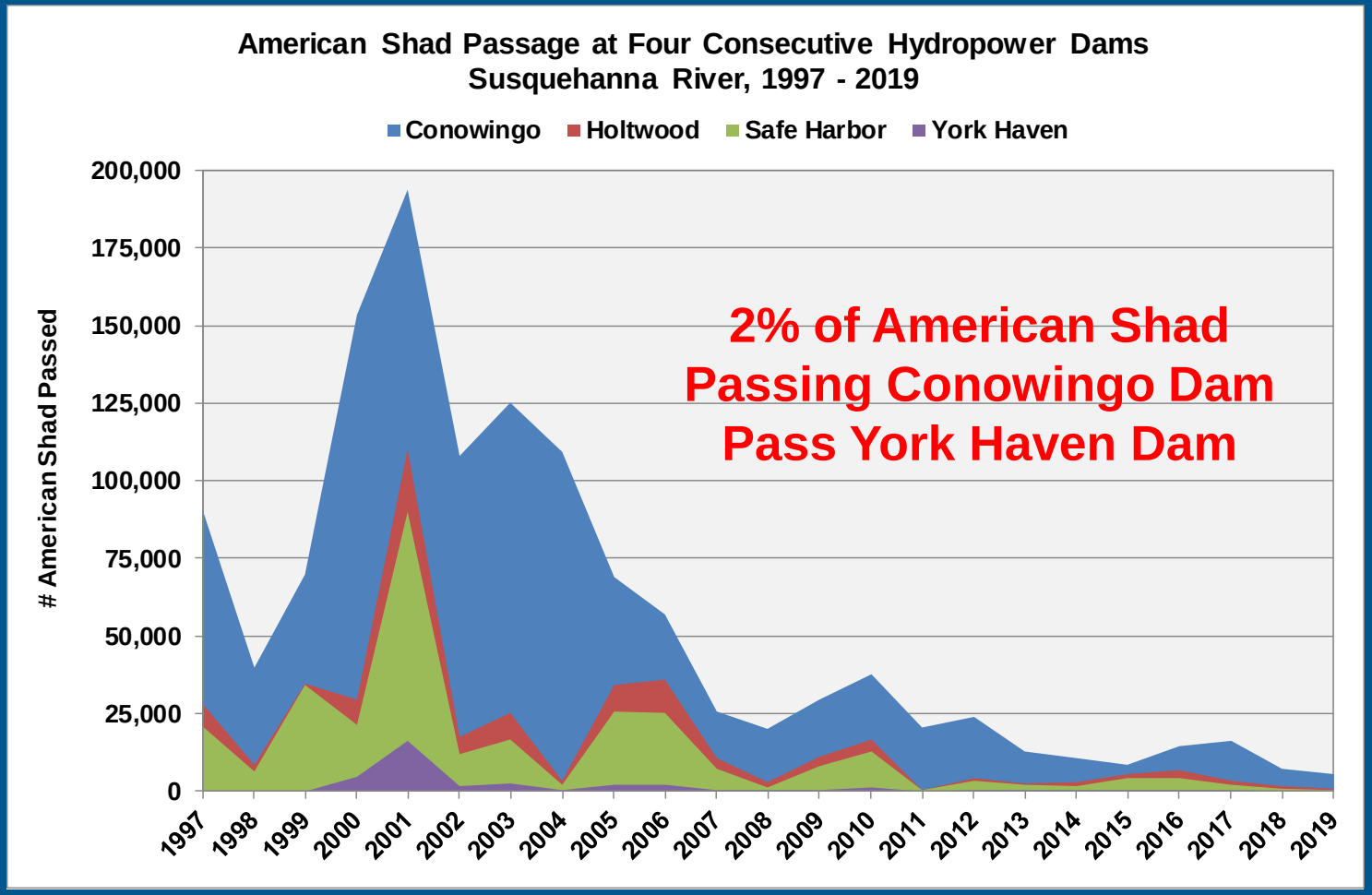
Hatchery Survival (Viable Egg to Stocked Fry) by Egg Source				
Egg Source	**Total Viable Eggs**	**Total Fry Stocked**	**Hatchery Survival (%)**	**Mean Age (d) at Stocking**
Potomac River	426,130	275,000	64.5%	26
Susquehanna River	665,171	557,000	83.7%	21
Total	***1,091,301***	***832,000***	***76.2%***	***23***

Van Dyke Stocking History



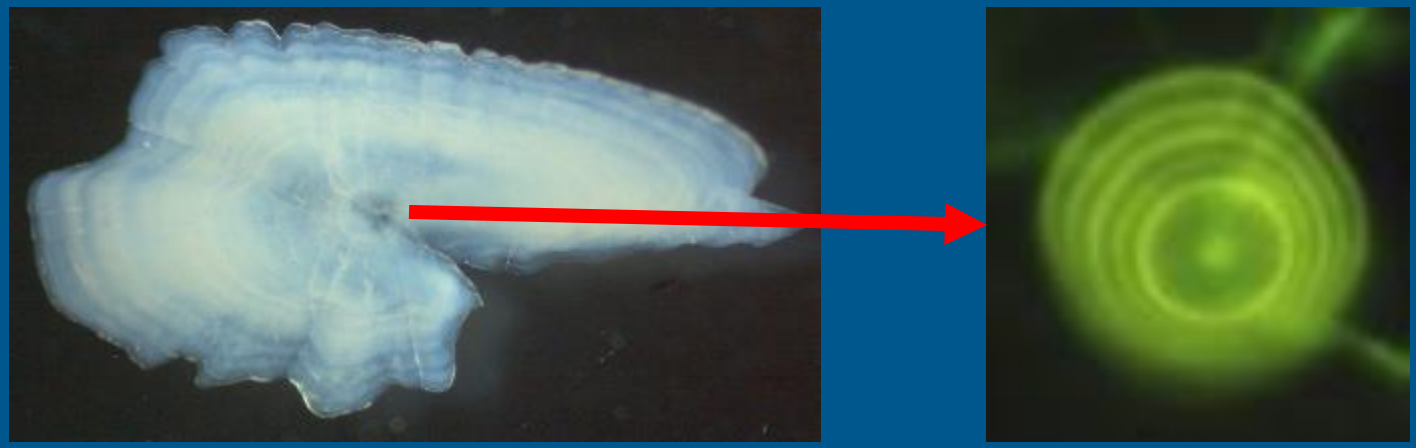
2019 Biomonitoring - Adults

- Passage



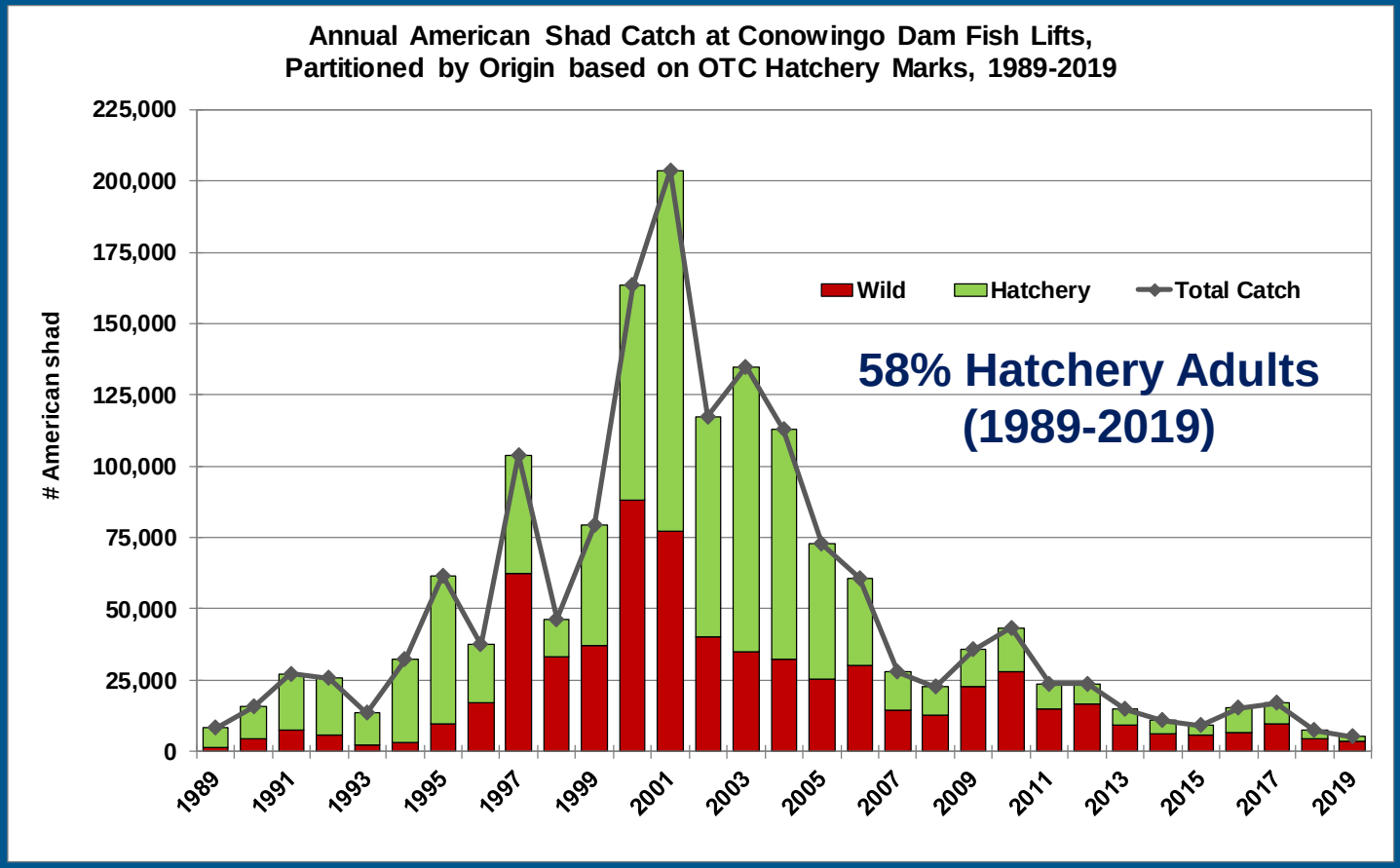
2019 Biomonitoring - Adults

- Otolith Analysis for OTC Tags – Conowingo Catch
  - Preliminary Results
    - 295 samples
      - 269 Spawning Trials, 21 Sacrifices, 5 Holding Morts
    - 31% Hatchery & 69% Wild
    - Results & data to be reviewed & proofed



2019 Biomonitoring - Adults

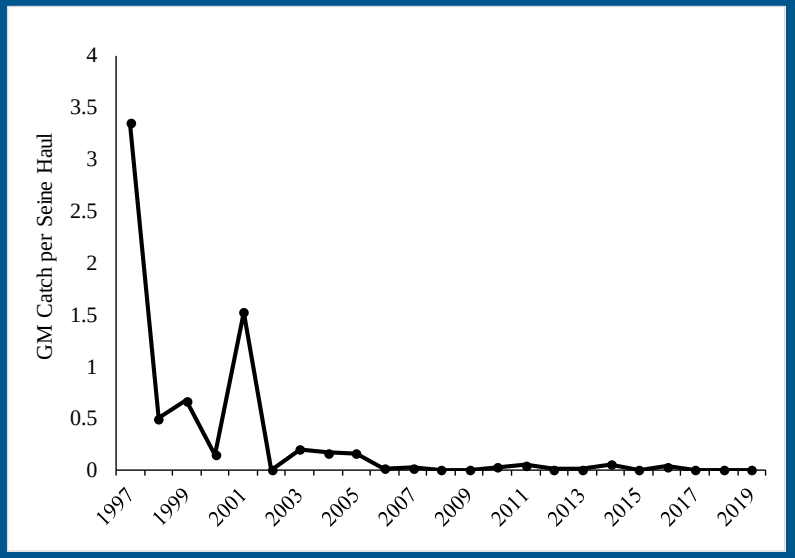
- Shad origin applied to overall catch at Conowingo



469 Fry to return 1 adult (1986-2011 cohorts)

2019 Biomonitoring – Juveniles

- Haul Seine Survey:
  - Emigration timing, abundance, hatchery evaluation
  - 15 events completed, 1 YOY recovered mid-July
  - Juvenile abundance remains depressed
  - OTC analysis to be completed



- Strainer Screen Samples?

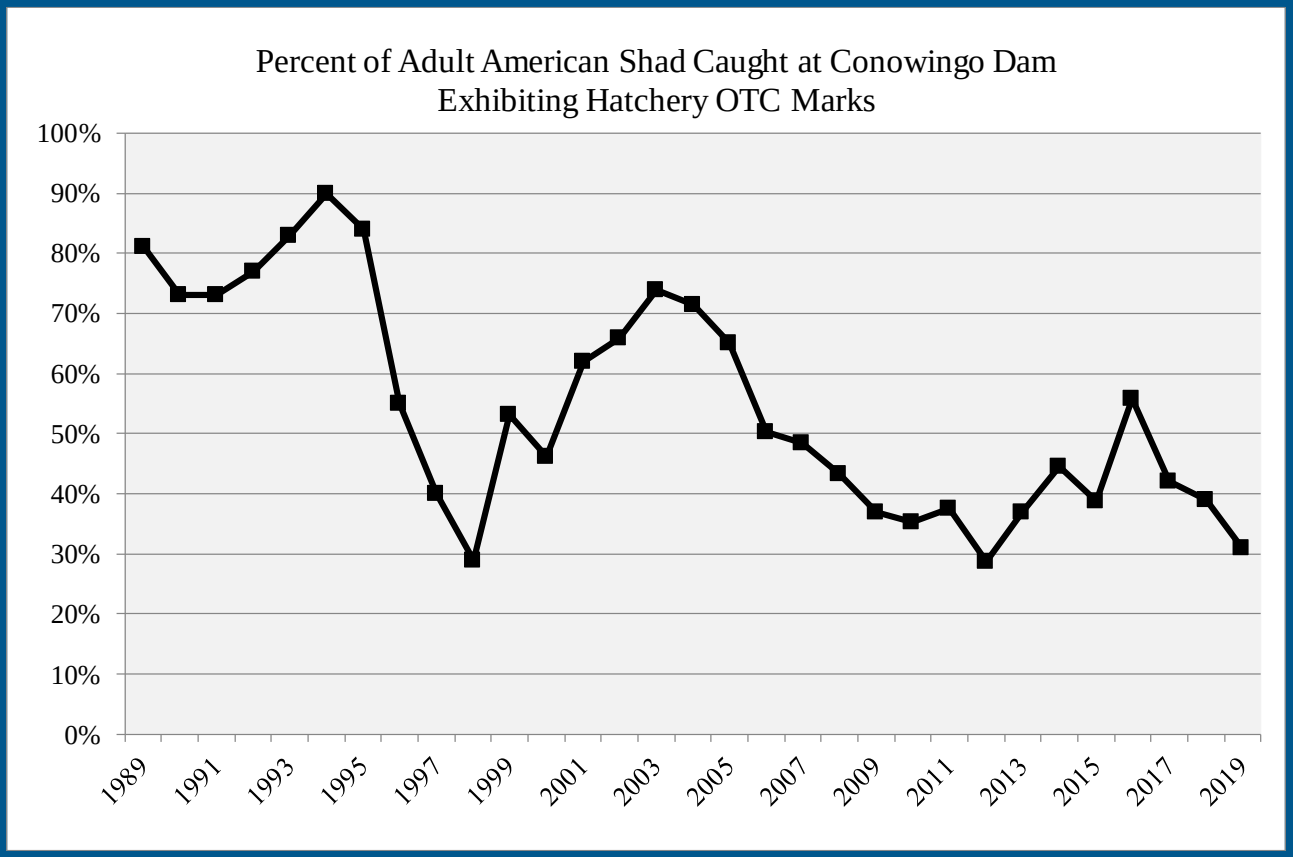
Ongoing Activities

- Review & proof OTC tag analysis & aging data
- 2020 production & hatchery operations planning
- Awaiting Comptroller approval of US FWS egg collection contract
- Preparing Bio-monitoring grant application for next 5-year project period

PFBC Planned Activities for 2020

- Operate Van Dyke
  - Egg Sources: Susquehanna & Potomac Rivers
  - Fry Stocking: Juniata, W & N Branches Susquehanna
  - OTC Tagging: all fry, unique sequences (Juniata)
- Shad Biomonitoring
  - Adults: Conowingo WFL
  - Juveniles: haul sein, strainer screens

Questions?


Percent of Adult American Shad Caught at Conowingo Dam
Exhibiting Hatchery OTC Marks
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019