

Susquehanna River Anadromous Fish Restoration Cooperative



Summary of 2018 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 2019



Van Dyke Hatchery - Overview

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



Photo: CBP

2018 Hatchery Operations - Eggs

2018 American Shad Egg Shipment Summary

Egg Source	# Shipments	Volume of		# Viable	% Viable
		Eggs (L)	# Eggs	Eggs	
Potomac River, Strip Spawn - USFWS	15	342.3	16,494,265	3,301,728	20.0%
Susquehanna R, Tank Spawn - Normandeau	5	38.7	2,111,420	961,069	45.5%
Delaware River, Strip Spawn - PFBC	5	62.5	5,147,509	418,011	8.1%
Total	25	443.4	23,753,194	4,680,807	19.7%

• Potomac

- 15 Shipments, 4/17-5/9
- 3.3-million live eggs
- 20% Viability (2.5 - 47.9%)
- 2006-2017 mean viability 36%

• Susquehanna

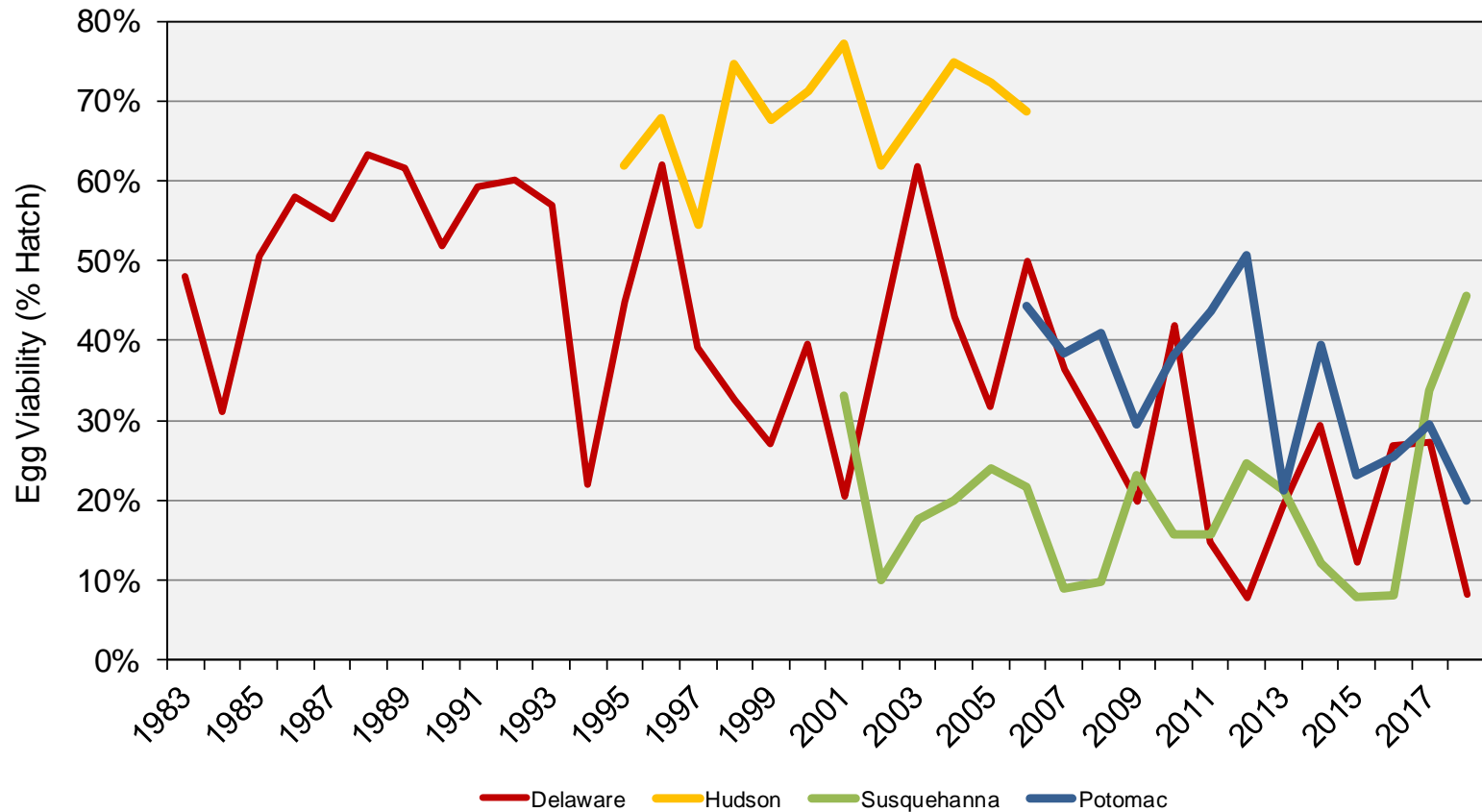
- 5 Shipments, 5/7-5/17
- 961,000 live eggs
- 45.5% Viability (12.4 - 57.1%)
- 2001-2017 mean viability 19%

• Delaware

- 5 Shipments, 5/16-6/1
- 418,000 live eggs
- 8.1% Viability (0.0 – 42.7%)
- 1983-2017 mean viability 39%



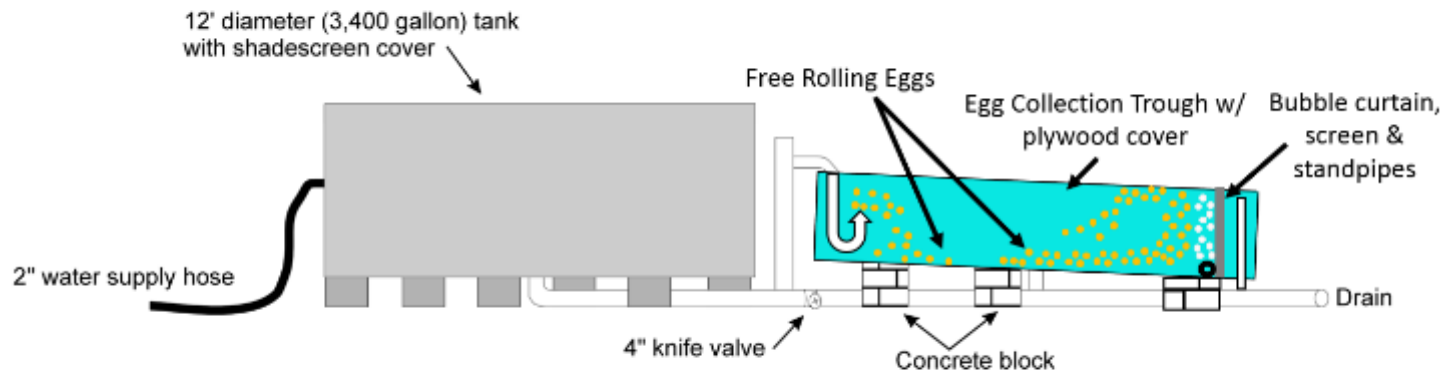
Viability of American Shad Eggs Used For Fry Culture at Van Dyke, 1983 - 2018



2018 Hatchery Operations - Eggs

- WFL Tank Spawning Improvements (2017&2018)

Tank Spawning Setup – The Rolling Eggs



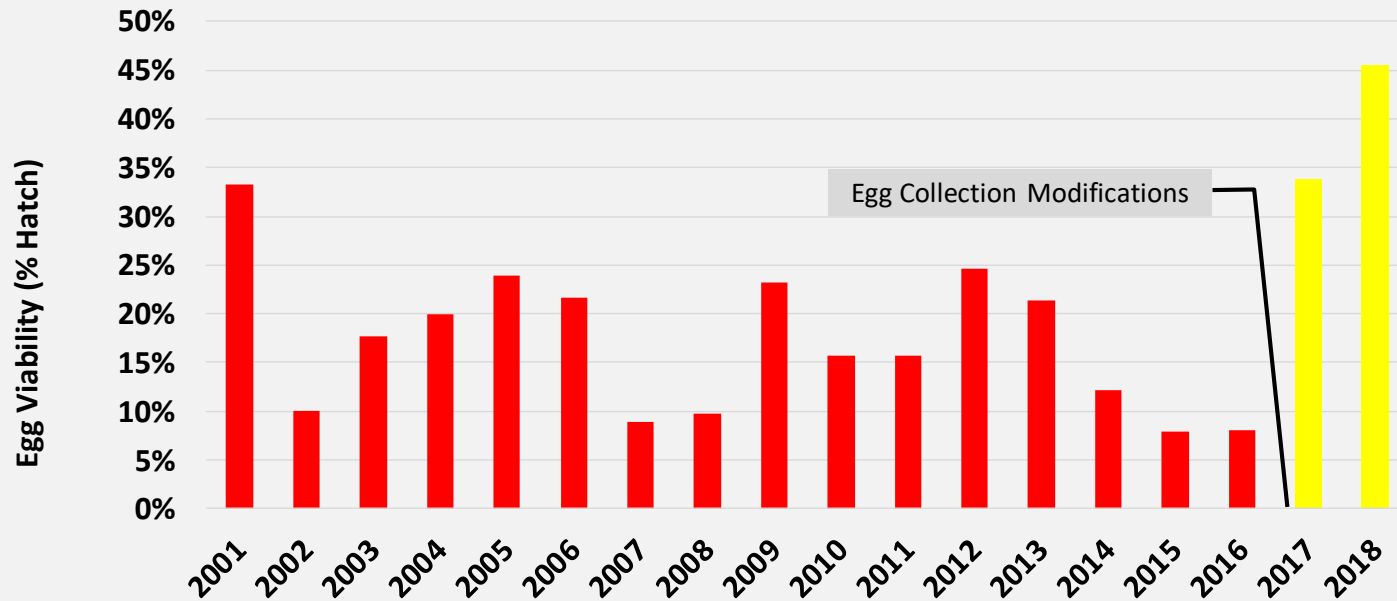
- Spawned eggs roll freely
 - Not forced into a sock
- Bubble curtain
 - aerates, moves water, rolls eggs, keeps screen from fouling



Modifications to plumbing, egg collection & flow



American Shad Egg Viability, West Lift Tank Spawning 2001-2018



2018 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	3,301,728	1,997,927	60.5%	34
Susquehanna River	961,069	742,753	77.3%	21
Delaware River	418,011	378,537	90.6%	18
Total	4,680,807	3,119,216	66.6%	29



High river flows delayed many stockings



2018 Hatchery Operations - Stocking

2018 Susquehanna Basin American Shad Fry Stocking Summary						
Stocking Culture					Age at	
Date	Tank	OTC Tags (d)	Stocking Location	Egg Source	Stocking (d)	# Fry
6/1	A2	3,6,12,18	Juniata River - Narrows	Potomac	32	120,000
6/1	C1	3,6,12,18	Juniata River - Narrows	Potomac	24	120,000
6/19	C3	3,6,12,18	Juniata River - Narrows	Potomac	40	56,000
6/19	D1	3,6,12,18	Juniata River - Narrows	Potomac	36	156,076
6/19	D4	3,6,12,18	Juniata River - Narrows	Potomac	35	125,236
Junita River						577,312
6/1	A1	3,6,18	Raystown Br. Juniata River	Potomac	37	75,000
6/1	B4	3,6,18	Raystown Br. Juniata River	Potomac	25	115,000
6/18	C2	3,6,18	Raystown Br. Juniata River	Potomac	39	98,425
6/18	C4	3,6,18	Raystown Br. Juniata River	Potomac	38	89,064
6/18	D3	3,6,18	Raystown Br. Juniata River	Potomac	33	105,723
Raystown Br. Juniata R.						483,213
6/6	D2	3,6,9	Susquehanna (Montgomery Ferry)	Susquehanna	23	88,479
6/6	E1	3,6,9	Susquehanna (Montgomery Ferry)	Susquehanna	20	18,100
6/7	E2	3,6,9	Susquehanna (Montgomery Ferry)	Susquehanna	18	169,391
6/7	E3	3,6,9	Susquehanna (Montgomery Ferry)	Susquehanna	17	262,247
6/20	F1	3,6,9	Susquehanna (Montgomery Ferry)	Susquehanna	28	204,536
Mainstem Susquehanna R.						742,753
6/4	A3	3,6,9,12,15,18	North Br. Susquehanna River	Potomac	34	250,000
6/4	A4	3,6,9,12,15,18	North Br. Susquehanna River	Potomac	33	175,000
N. Br. Susquehanna R.						425,000
6/5	B1	3,9,18	West Br. Susquehanna River	Potomac	33	166,841
6/5	B2	3,9,18	West Br. Susquehanna River	Potomac	33	196,771
6/5	B3	3,9,18	West Br. Susquehanna River	Potomac	32	148,790
W. Br. Susquehanna R.						512,402
Susquehanna Basin Total						2,740,679



2018 Hatchery Operations - Stocking

2018 Delaware Basin American Shad Fry Stocking Summary

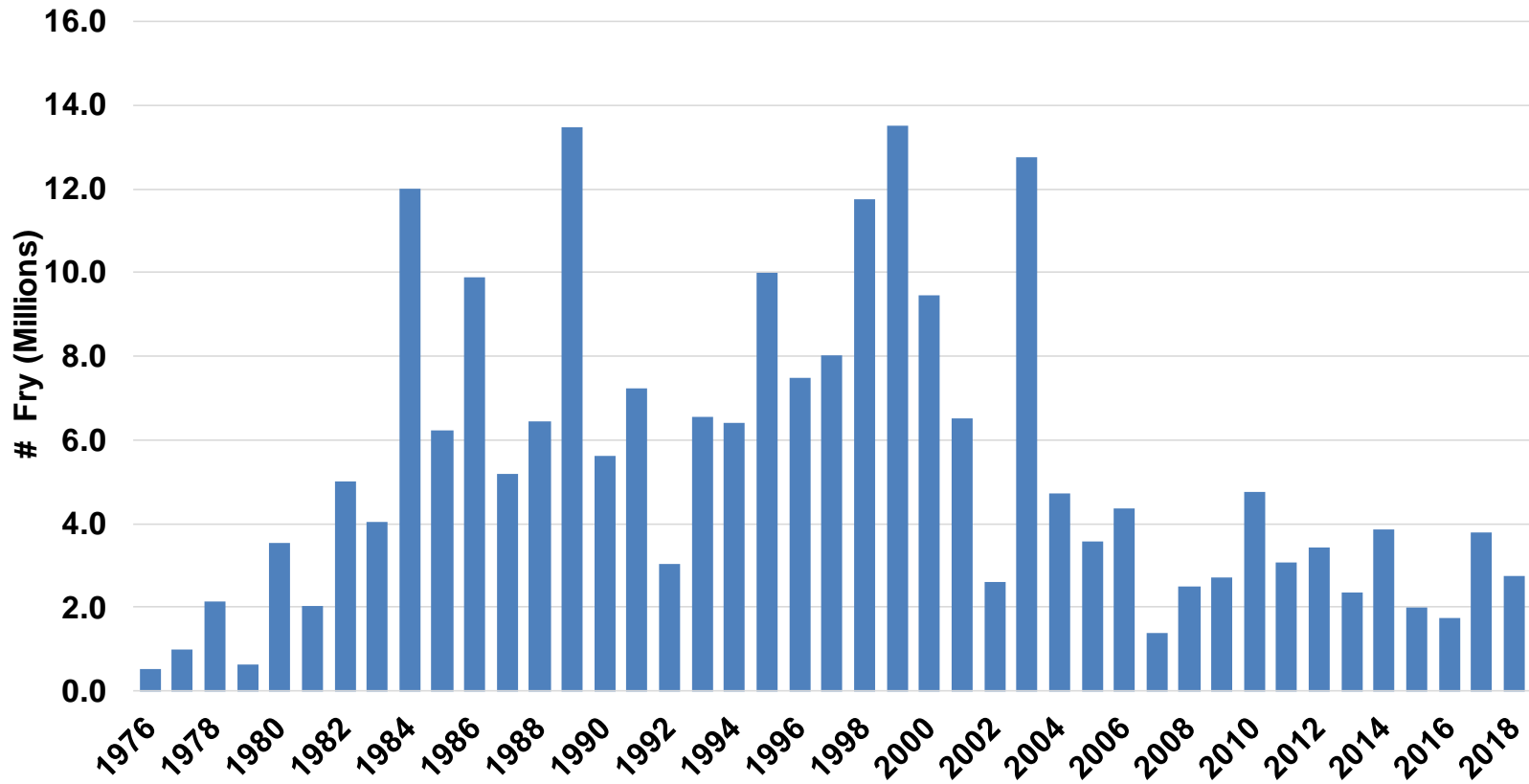
Stocking Culture

Date	Tank	OTC Tags (d)	Stocking Location	Egg Source	Age at Stocking (d)	# Fry	
6/14	E4	9,12,15	Lehigh River	Delaware	22	304,362	
						Lehigh River	304,362
6/21	F2	3,6,9,12	Schuylkill River	Delaware	19	61,484	
6/21	F3	3,6,9,12	Schuylkill River	Delaware	13	12,691	
						Schuylkill River	74,174
						Delaware Basin Total	378,537



Van Dyke Stocking History

Annual American Shad Fry Stockings,
Susquehanna River, 1976-2018

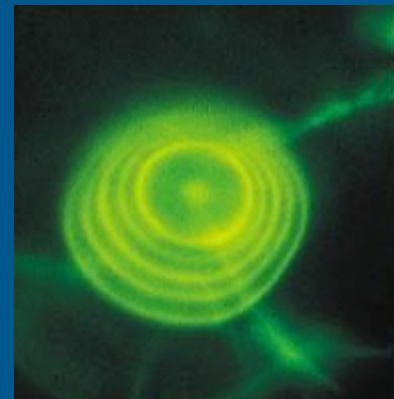
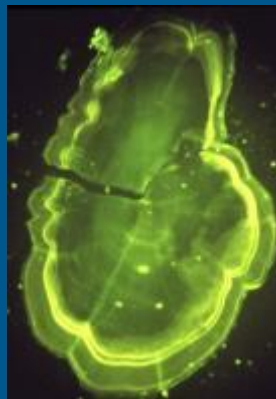


2018 Hatchery Operations - OTC

- OTC Tagging: hatchery & restoration monitoring

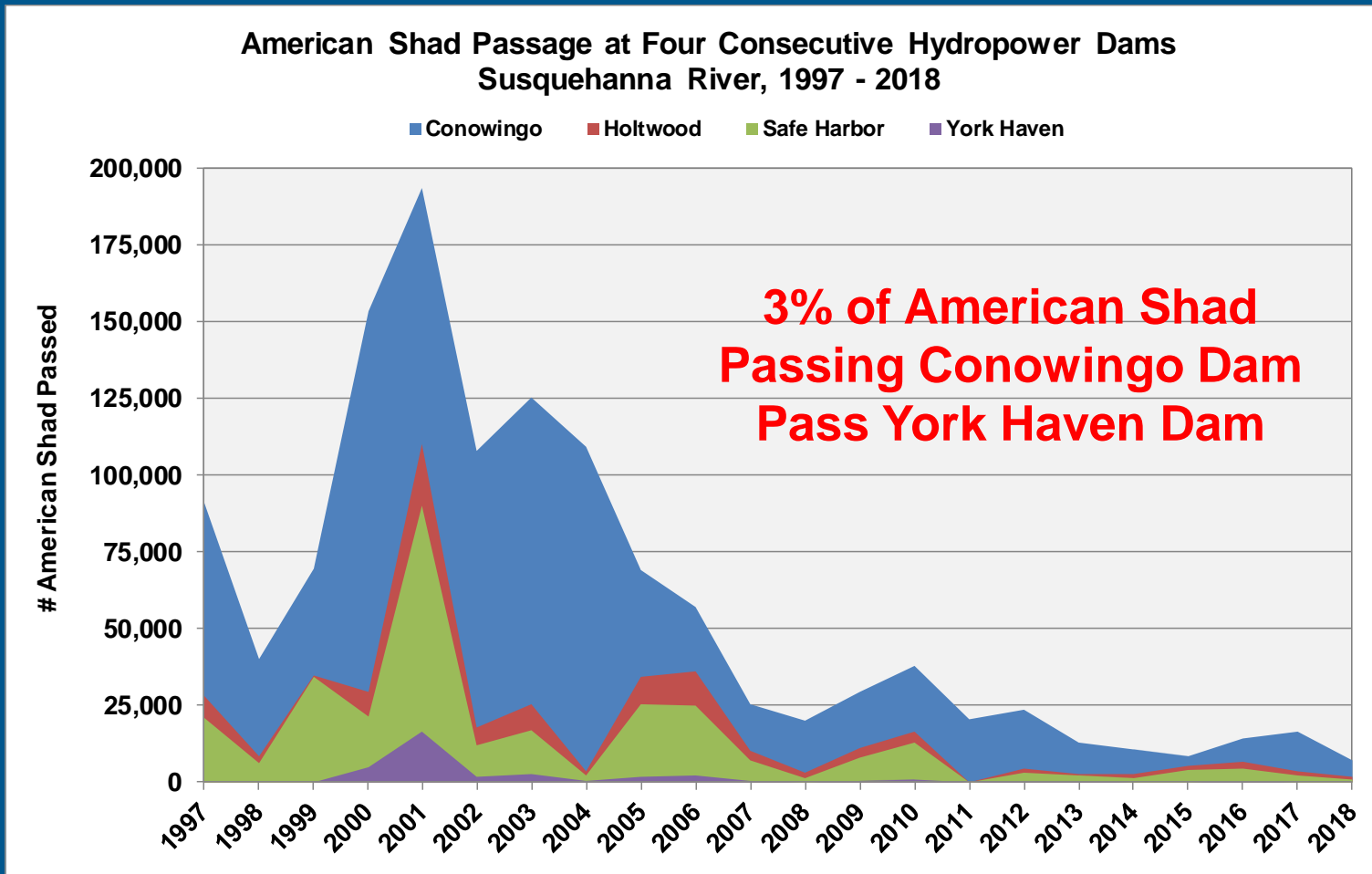
2018 OTC Tag Retention Analysis

River Basin	OTC Tags (d)	Stocking Location	Egg Source	# Lots	# Samples (Pooled)	QA/QC Tag Retention (%)
<i>Susquehanna</i>						
	3,6,9	Susquehanna (Montgomery Ferry)	Susquehanna	5	50	100
	3,6,18	Raystown Br. Juniata River	Potomac	5	50	100
	3,9,18	West Br. Susquehanna River	Potomac	3	30	100
	3,6,12,18	Juniata River - Narrows	Potomac	5	50	100
	3,6,9,12,15,18	North Br. Susquehanna River	Potomac	2	30	100
<i>Delaware</i>						
	9,12,15	Lehigh River	Delaware	1	30	100
	3,6,9,12	Schuylkill River	Delaware	2	30	100



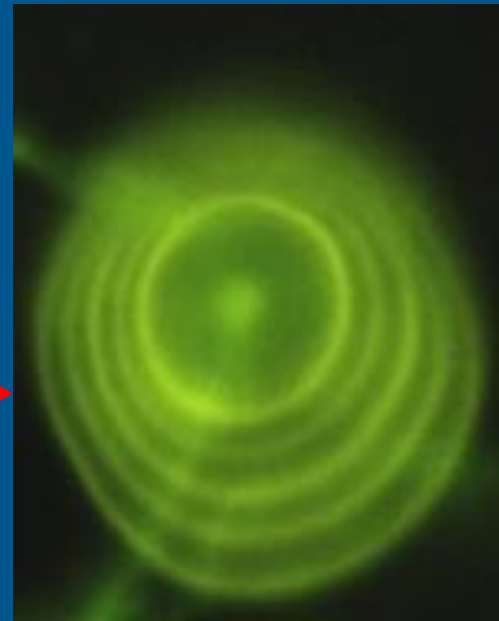
2018 Biomonitoring - Adults

- Passage



2018 Biomonitoring - Adults

- Otolith Analysis for OTC Tags



2018 Biomonitoring - Adults

- WFL collections: Otolith Analysis for OTC Tags

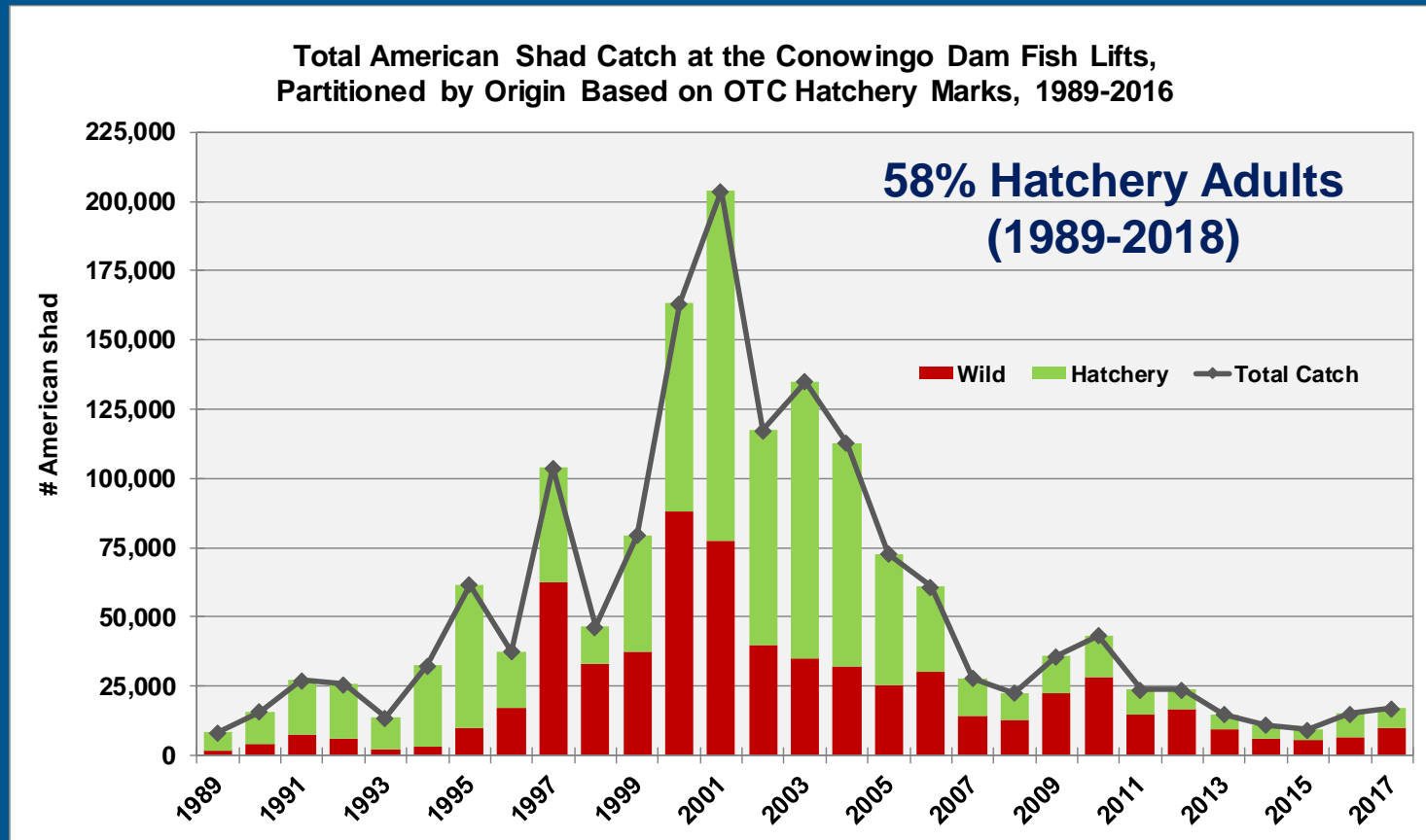
2018 Adult Otolith Analysis for OTC Tags						
Sample Type	# Wild	# Hatchery	?	Total	% Wild	% Hatchery
Spawn Trial #1	34	26		60	57%	43%
Spawn Trial #2	44	16		60	73%	27%
Spawn Trial #3	32	23		55	58%	42%
Spawn Trial #4	34	26		60	57%	43%
Spawn Trial #5	31	27	2	60	53%	47%
Overall	175	118	2	295	60%	40%
Sacrifices (1 of every 25)	13	5		18	72%	28%
Hold Mortalities	8	2		10	80%	20%
Summary of All Readable Otoliths						
Total	196	125		321	61%	39%

Overall, 61% Wild & 39% Hatchery



2018 Biomonitoring - Adults

- Shad origin applied to overall catch at Conowingo

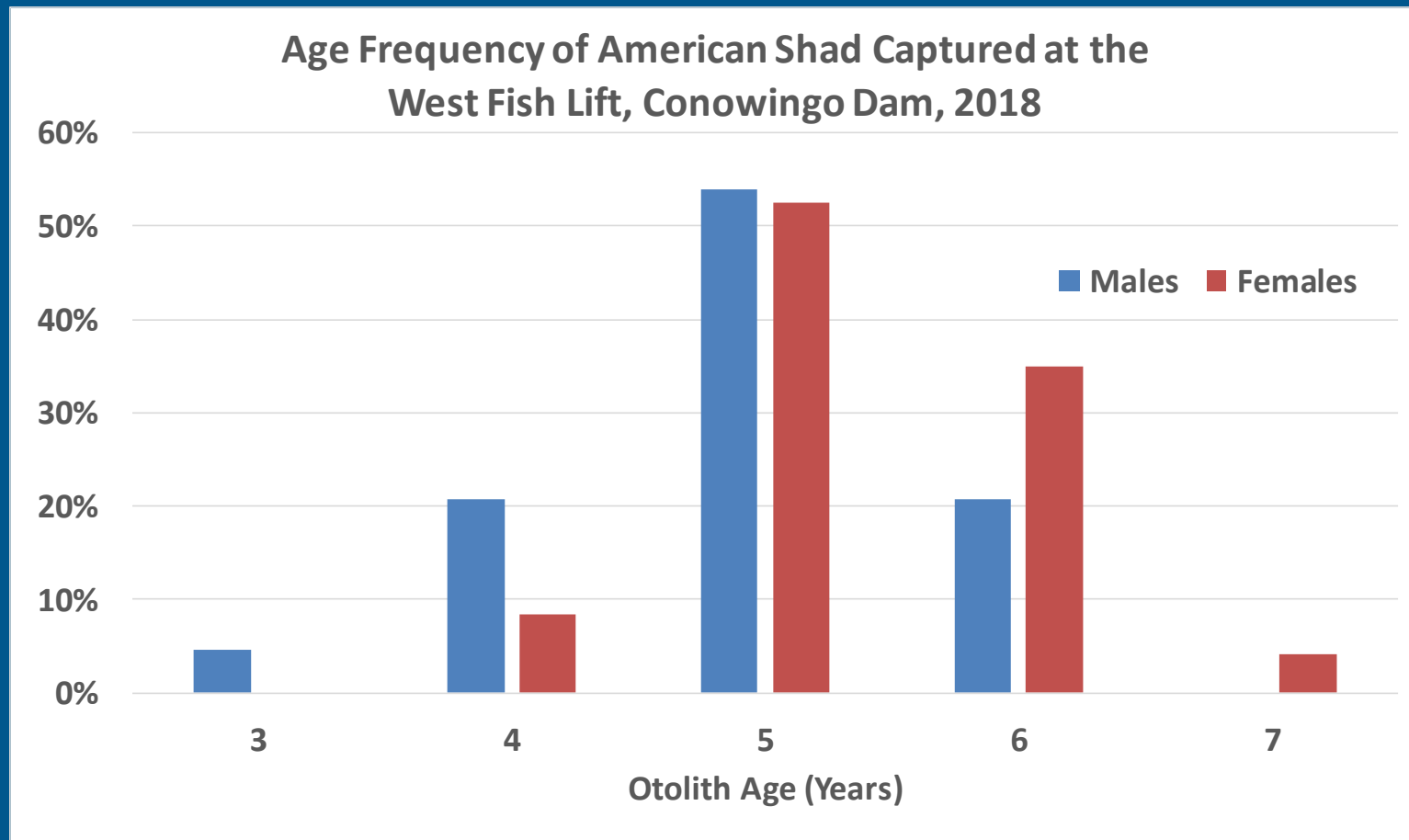


469 Fry to return 1 adult (1986-2011 cohorts)



2018 Biomonitoring - Adults

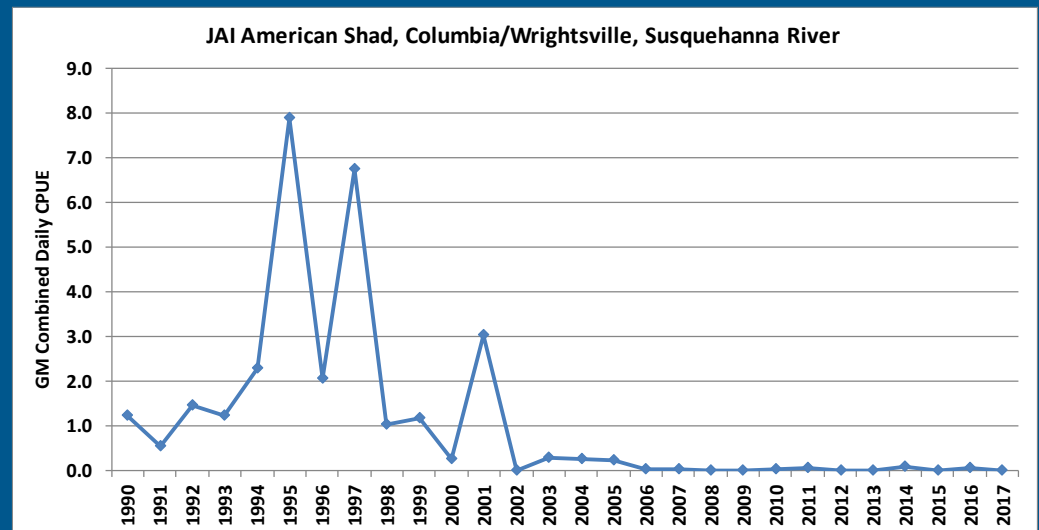
- WFL collections: Otolith Analysis for Age



2018 Biomonitoring – Juveniles

- Haul Seine Sampling:
 - Emigration timing, abundance, hatchery evaluation
 - 5 of 10 events completed (WET!)
 - No recoveries – Continue depressed trend

- Strainer Screens
 - 3 YOY Peach Bottom
 - 2 Hatchery, 1 YTBD
 - Other samples?



Ongoing Activities

- Scale Ageing
- Final review of OTC tag analysis & data proofing
- Building Reference Collections:
 - Known Age by unique OTC tag
 - Known Repeat Spawner (MDNR Recaptures)
- Summary Reports
- 2019 production & hatchery operations planning



PFBC Planned Activities for 2019

- Operate Van Dyke
 - Egg source: Susquehanna River Tank Spawn
 - Stocking: Juniata & Mainstem Susquehanna
 - OTC tag all fry
- Shad Biomonitoring
 - Adults: Conowingo WFL
 - Juveniles: Haul Sein, strainer screens, incidental catch



Questions?

