

LIFE HISTORY PARAMETERS OF COMMON NEARSHORE MARINE FISHES

MBC Applied Environmental Sciences

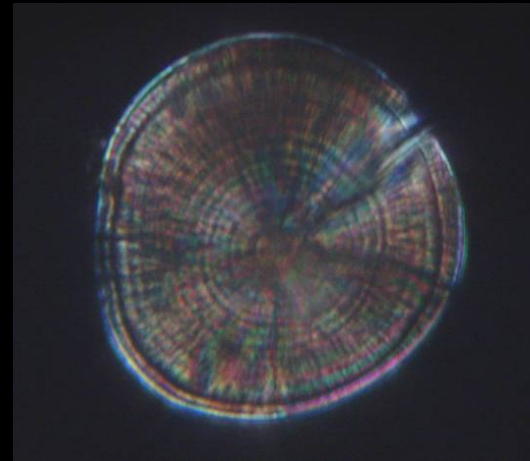


Project Team

- Project Manager
 - MBC Applied Environmental Sciences
 - Charles Mitchell, Project Manager
 - Eric Miller, presenting
- Subcontractors
 - Vantuna Research Group, Occidental College
 - Dan Pondella
 - Biology Department, Whittier College
 - Steven Goldberg

Proposed Studies

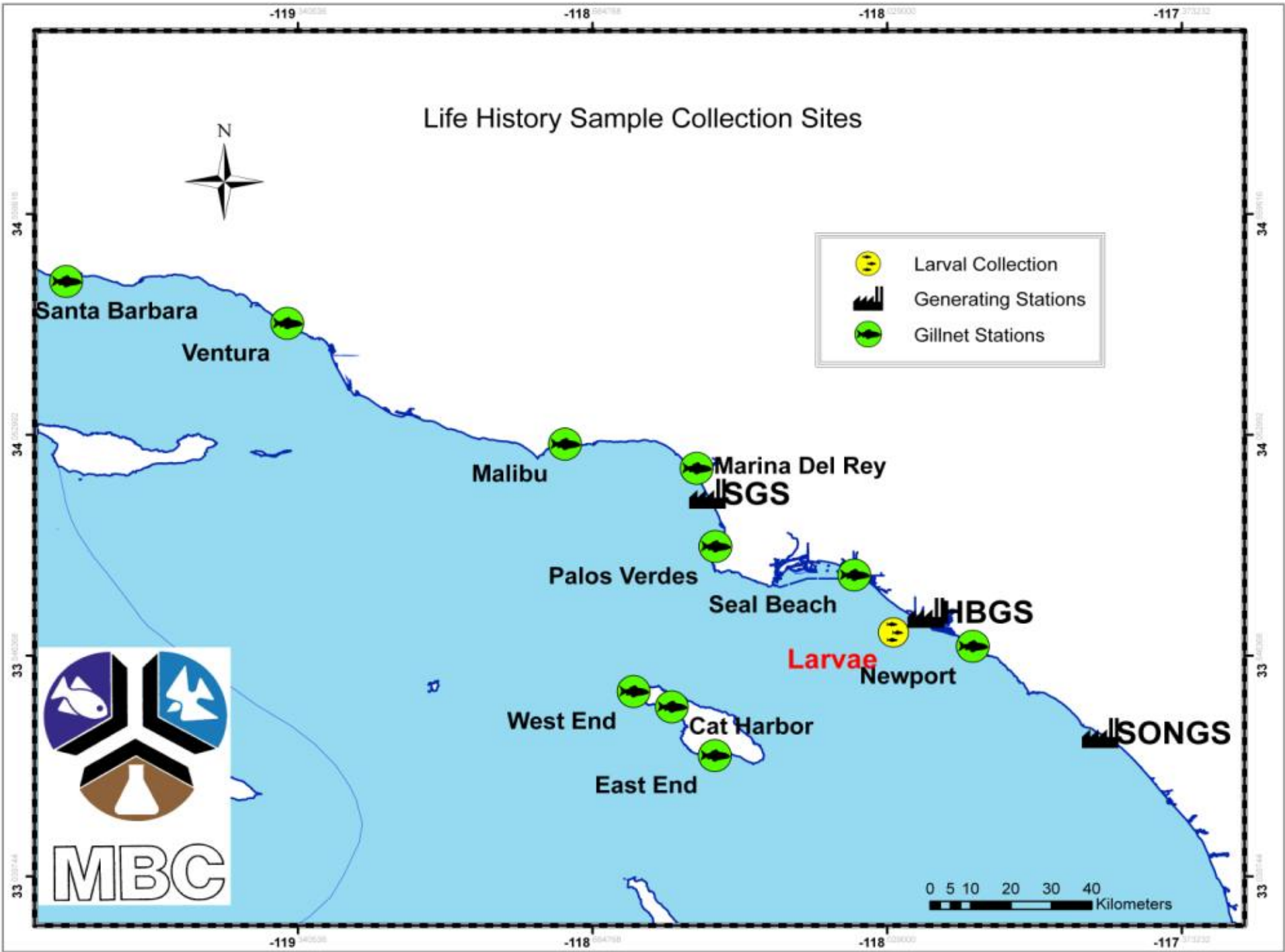
- Adult
 - Age and Growth
 - Yellowfin croaker (*Umbrina roncador*) and queenfish (*Seriphus politus*)
 - Fecundity
 - Spotfin croaker (*Roncador stearnsii*) and yellowfin croaker
 - Spawning Seasonality
 - Yellowfin croaker
- Larval Daily Growth
 - Queenfish, spotfin croaker, white croaker (*Genyonemus lineatus*)



Life History Sample Collection Sites



	Larval Collection
	Generating Stations
	Gillnet Stations





Methods

- **Adult**
 - **Age and Growth**
 - Transverse sectioned saggital otoliths
 - **Fecundity**
 - Count mature oocytes of a subsection of ovary
 - **Spawning Seasonality**
 - Histological analysis
- **Early Life History**
 - Daily band formation on saggital otoliths



Maximum reported size:
 556 mm TL Pt. Loma
 Kelp-Mike Shane

458 mm SL and 2181 g

Grouping	Parameters Estimated		
	L_{∞}	K	t_0
All (n=1209)	307.75	0.278	-0.995
All females & Immature (n=726)	313.17	0.307	-0.771
All males & Immature (n=744)	298.89	0.269	-1.072

Yellowfin Croaker Spatial Gillnet Survey CPUE Distribution



MBC

ANOVA, $df = 9,329$, $F = 19.9$, $p < 0.001$

Santa Barbara

Ventura

Malibu

Marina Del Rey

Palos Verdes

Seal Beach

Newport

West End

Cat Harbor

East End



0 4 8 16 24 32
Kilometers

-119

-118

-118

34

34

33

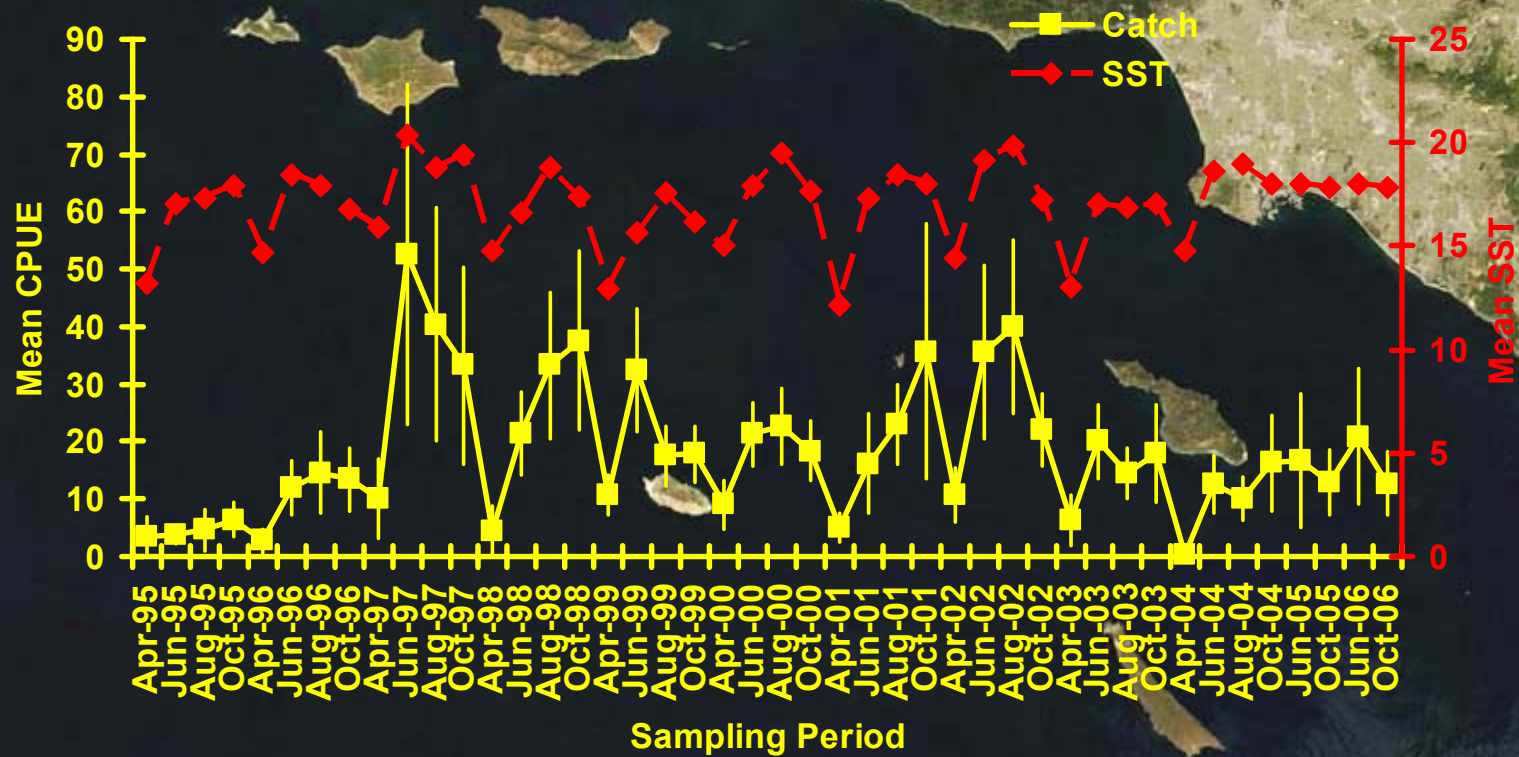
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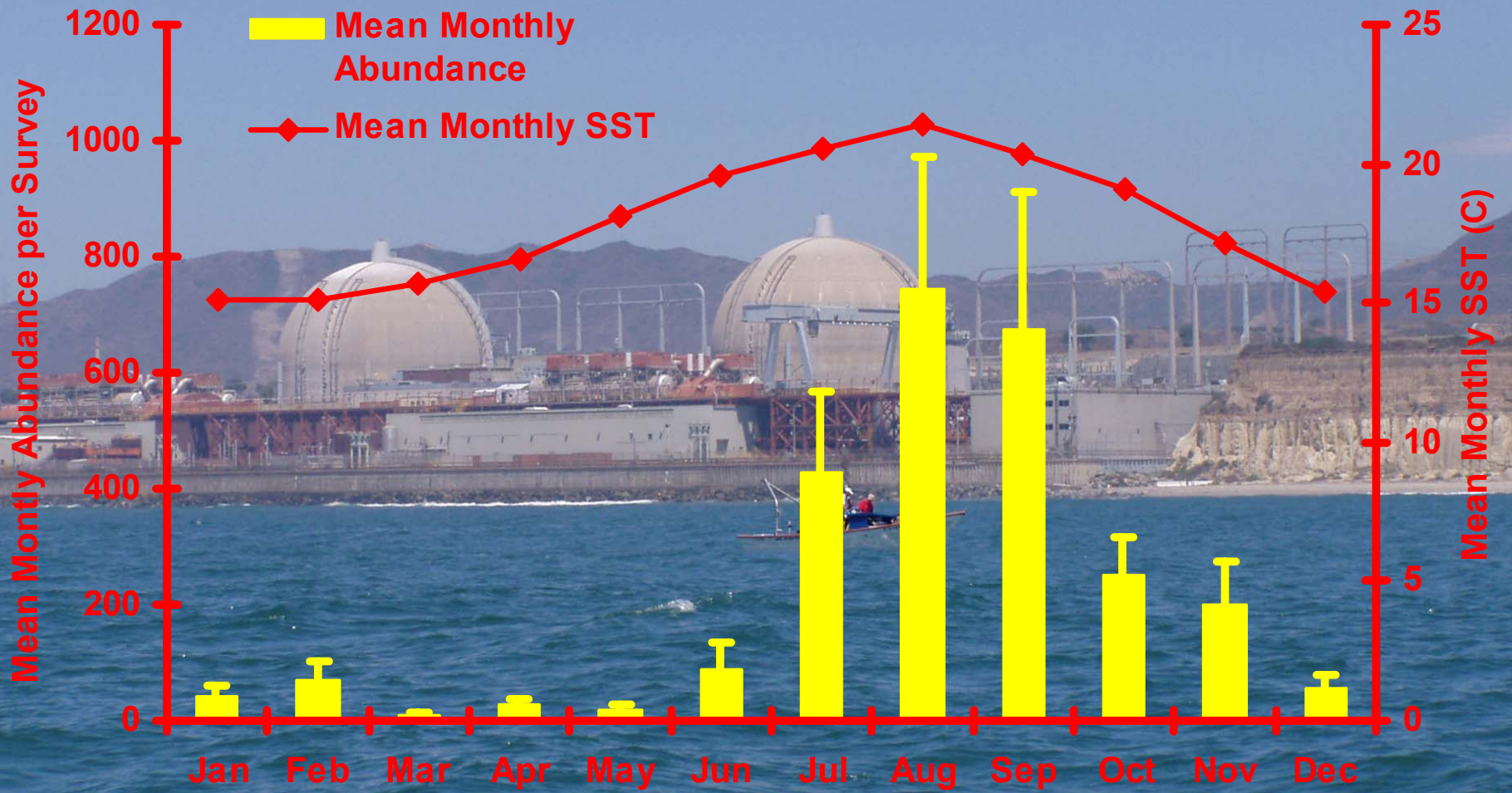
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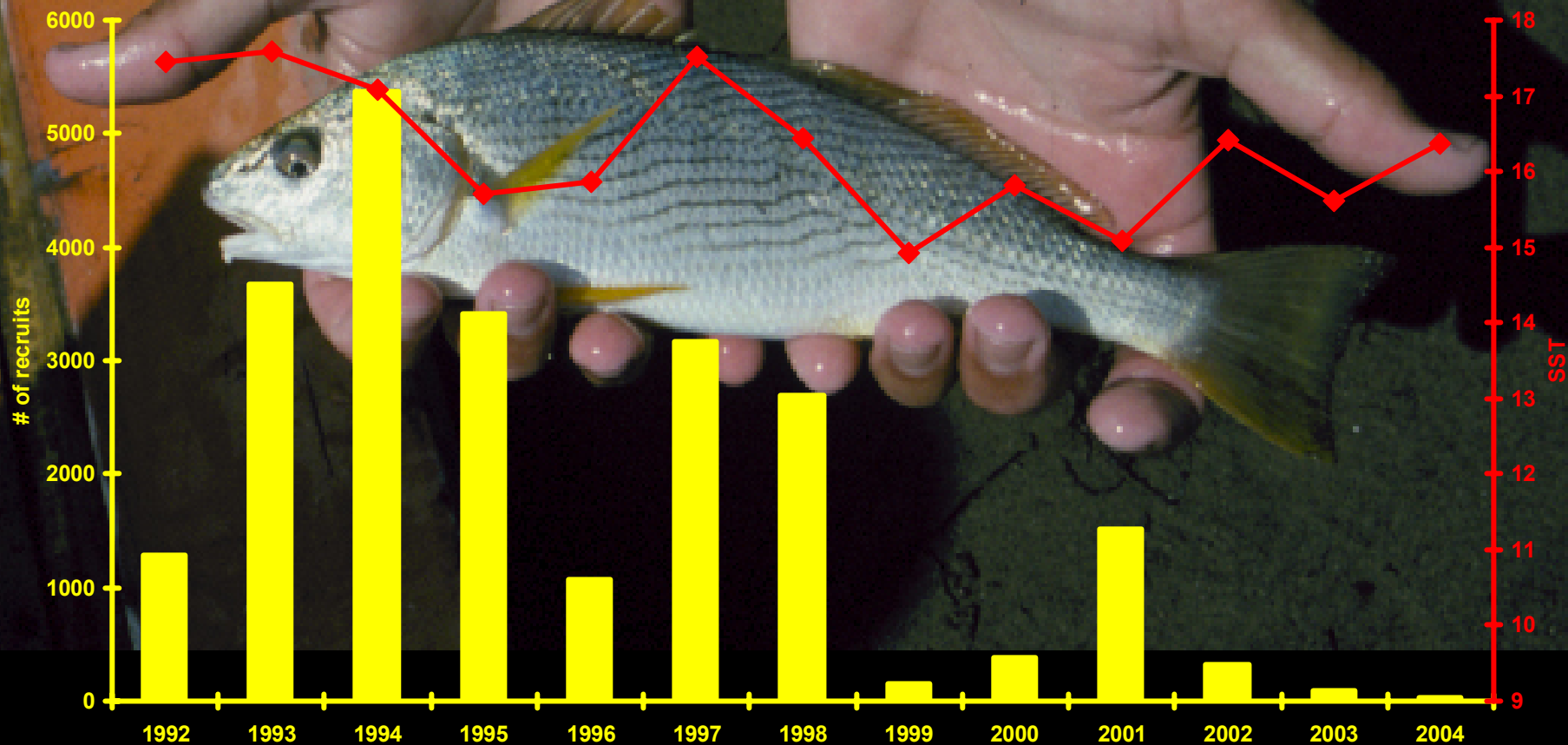


$r = 0.63, p < 0.001$



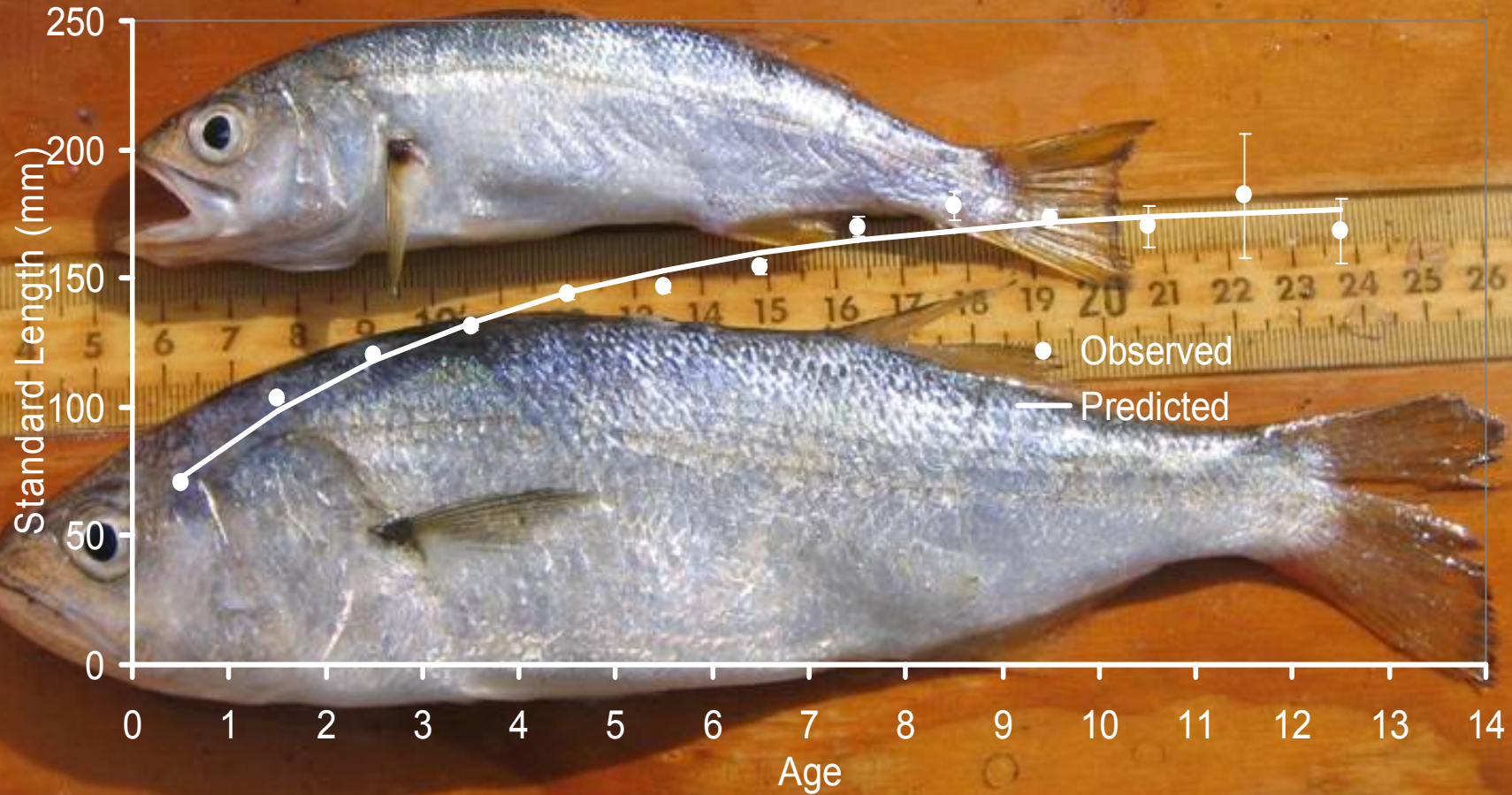
A = 0.4492, Z = 0.5694

1993-2004: r = 0.832, p = 0.0008

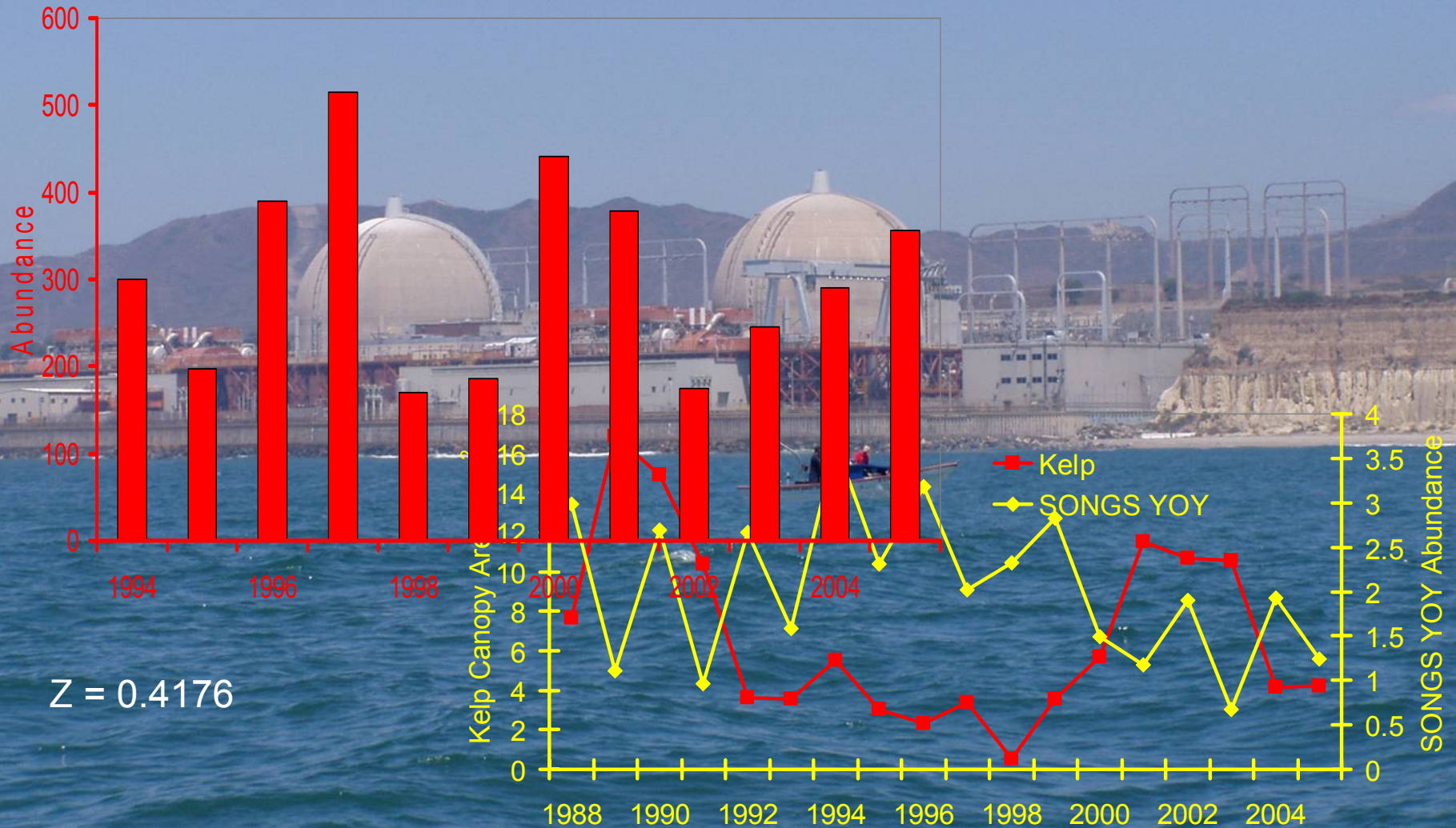


Hindcast recruitment calculated from annual survivorship (1-A)

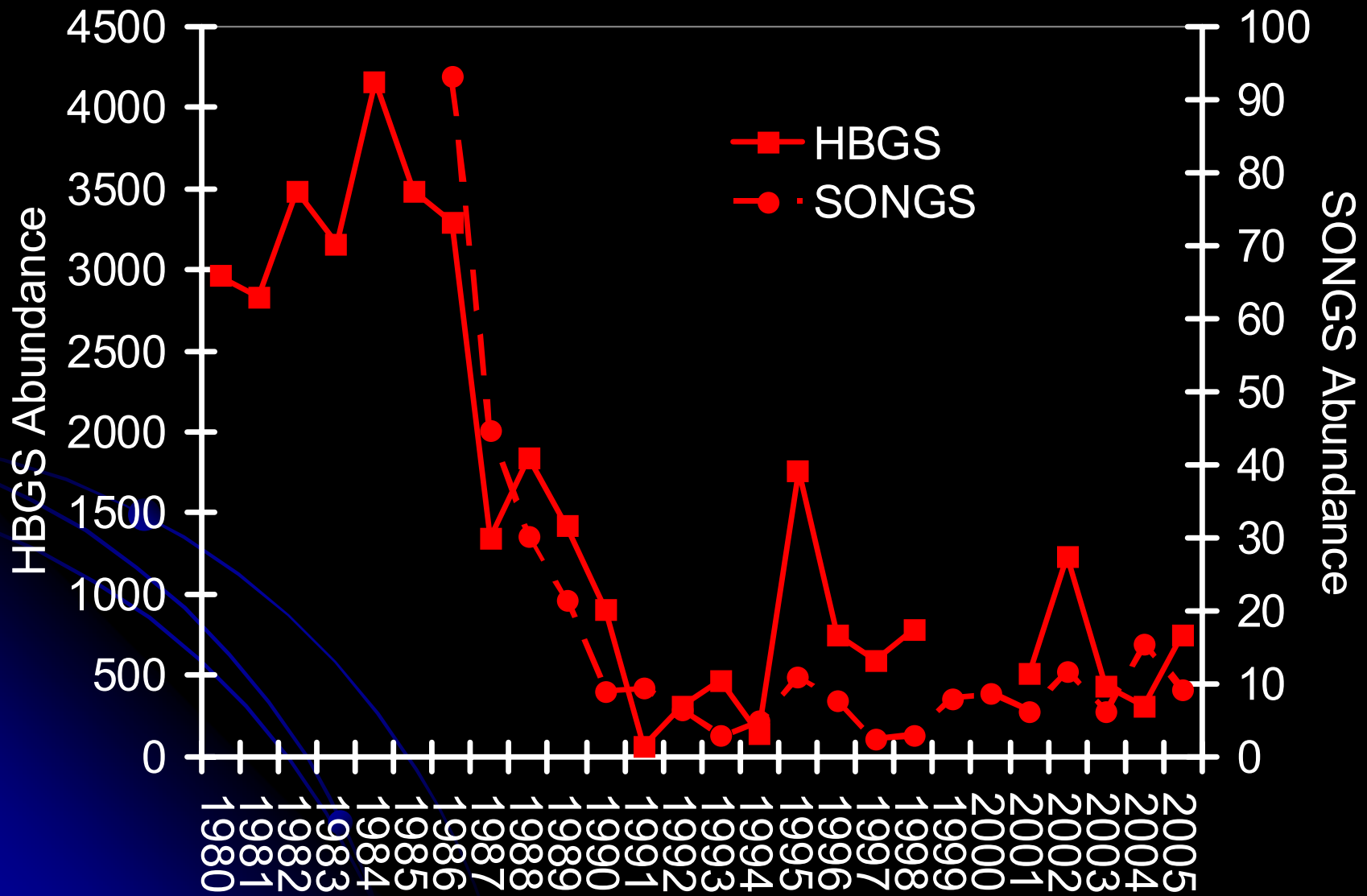
Queenfish Age and Growth



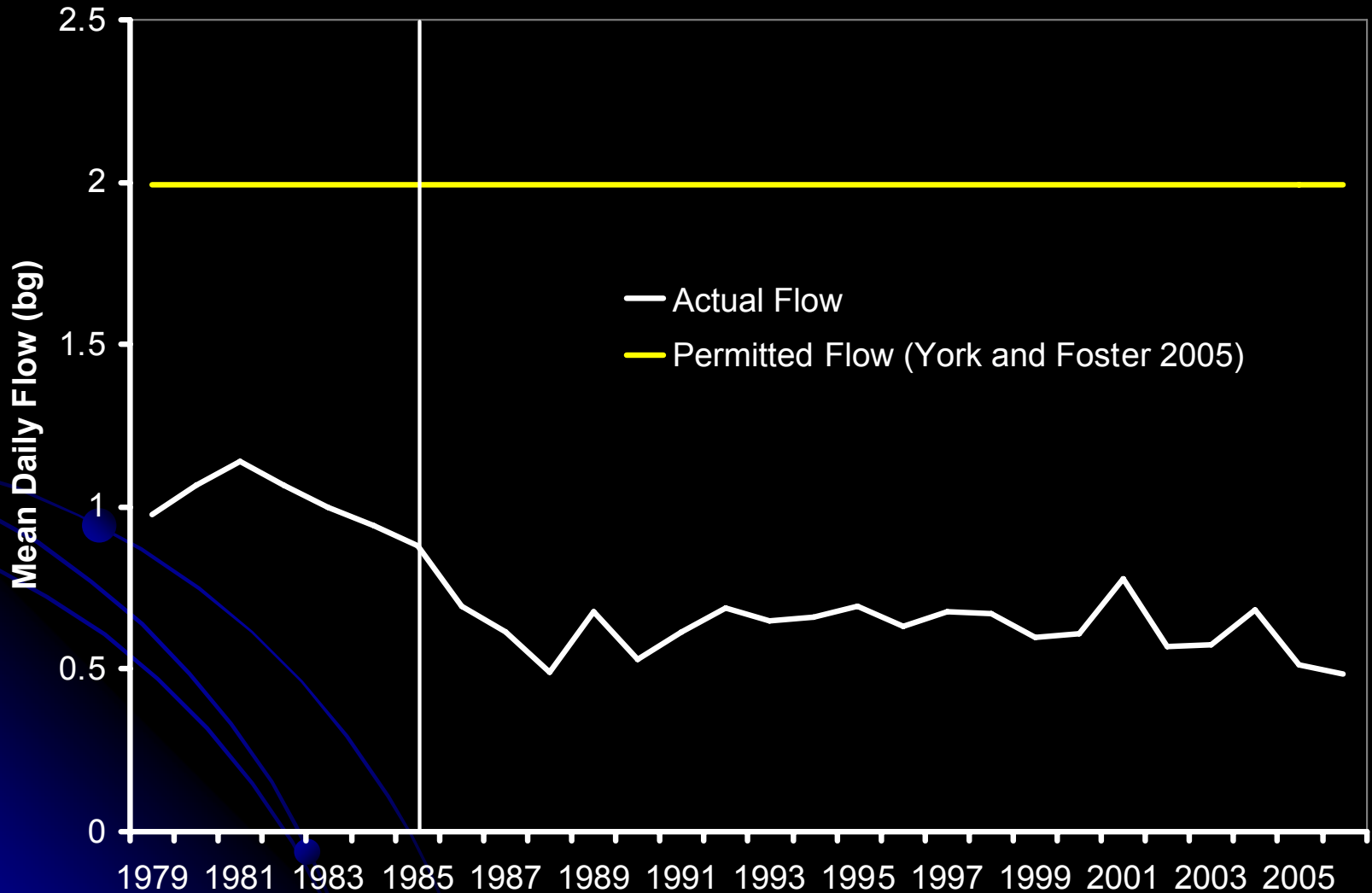
Recruitment Trends



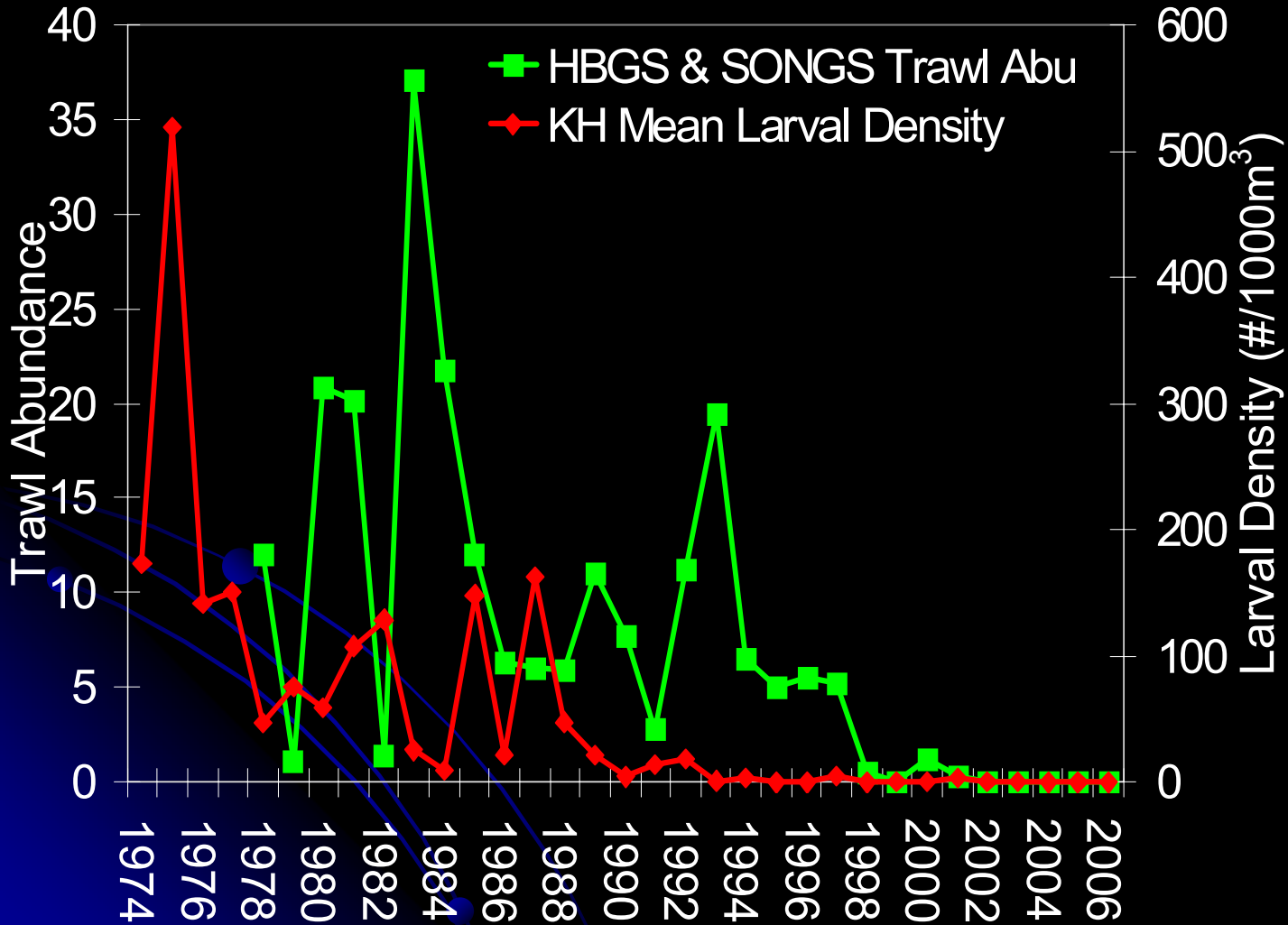
Long-Term Impingement Trend



Cumulative Annual Mean Daily Flow for RBGS, ESGS, and HBGS

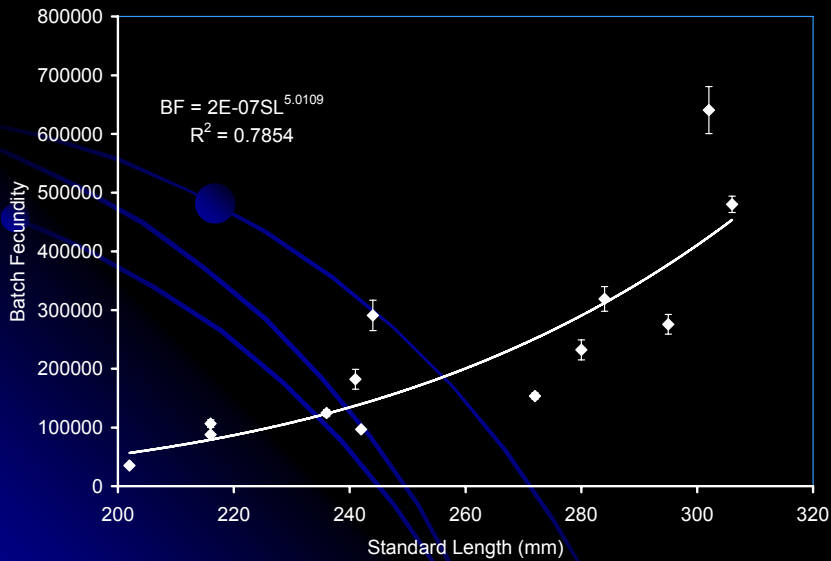


Abundance Trends

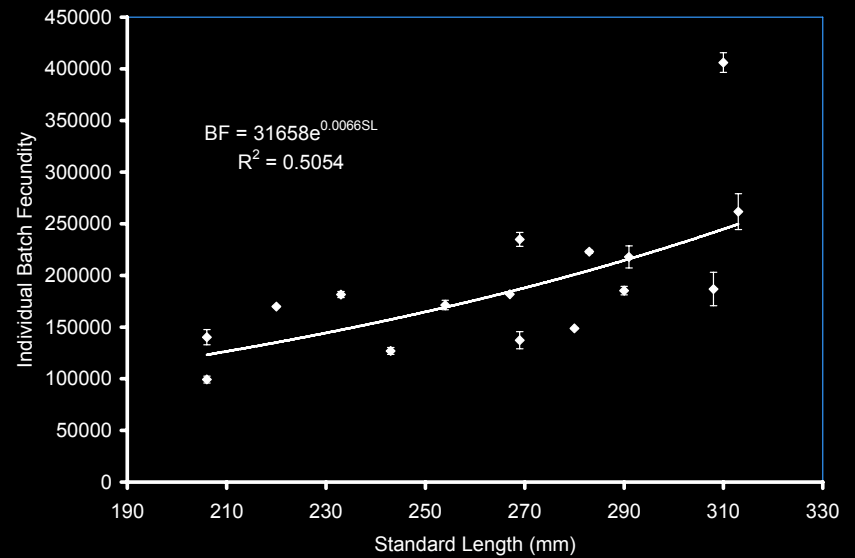


Lag	Cross Correlation	Std. Error(a)
-7	.451	.213
-6	.535	.209
-5	.615	.204
-4	.588	.200
-3	.614	.196
-2	.665	.192
-1	.603	.189
0	.558	.186
1	.533	.189
2	.485	.192
3	.283	.196
4	.383	.200
5	.210	.204
6	.033	.209
7	.100	.213

Fecundity

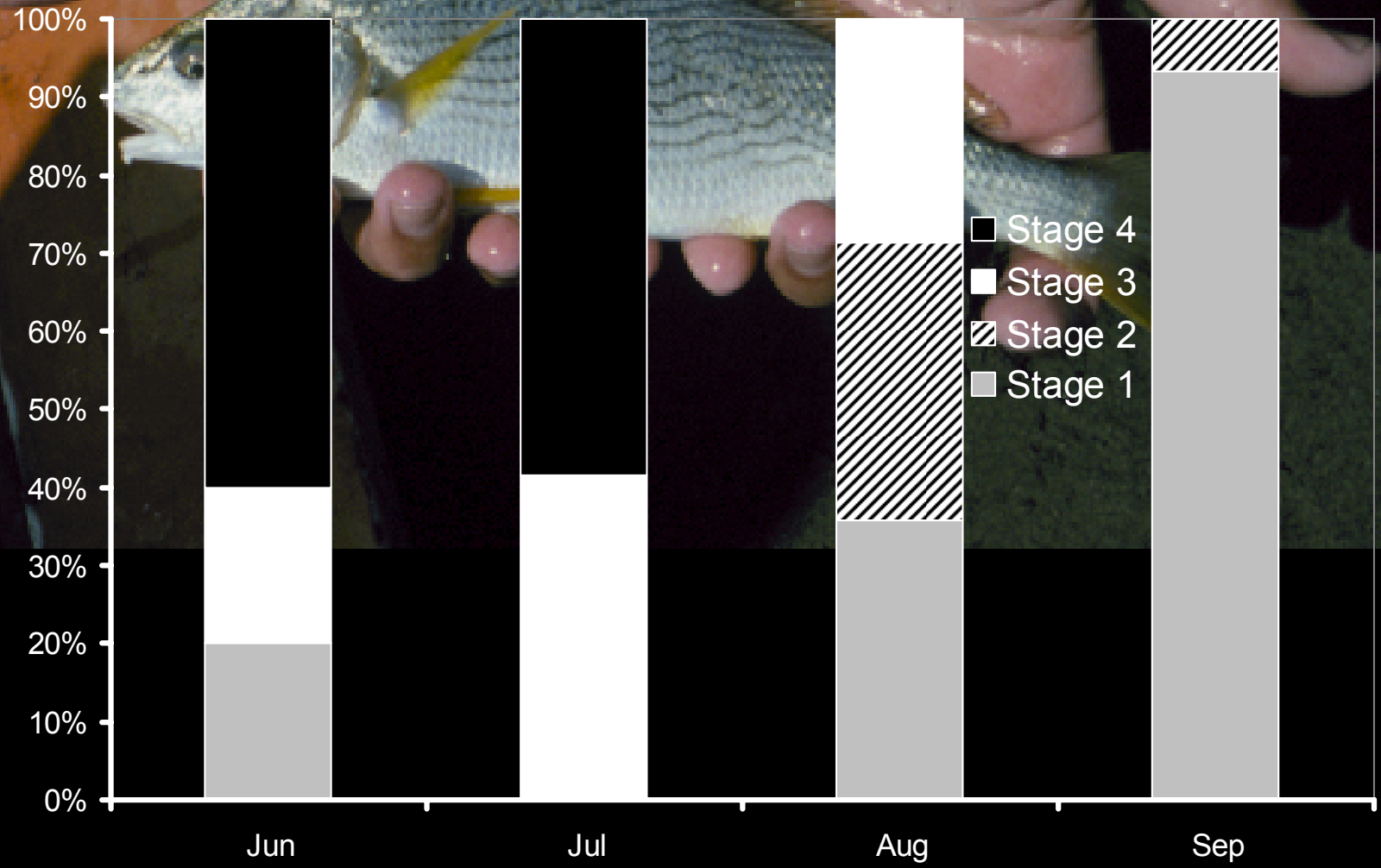


BF Range: 35,169 - 640,703

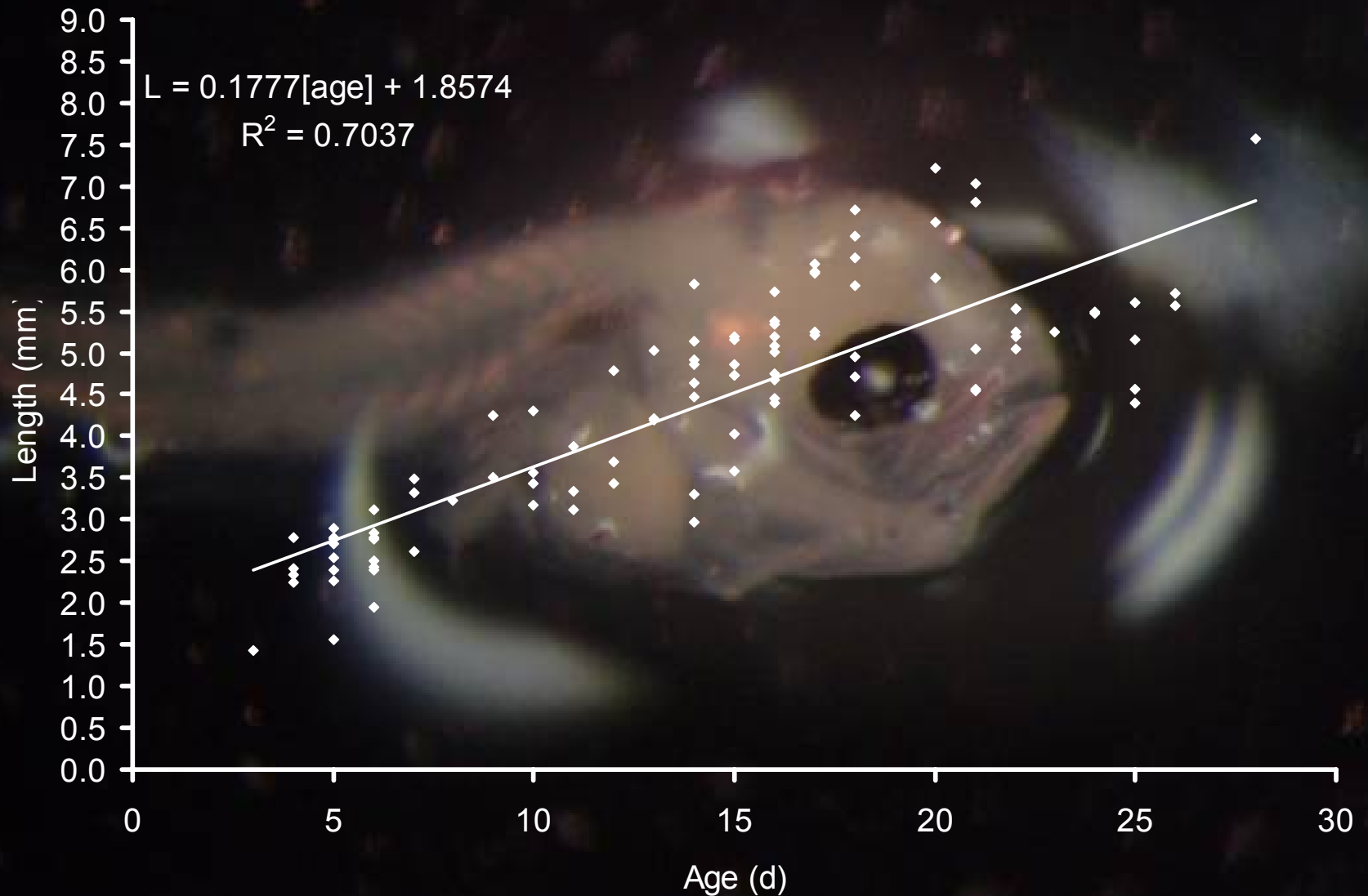


BF Range: 99,259 - 405,967

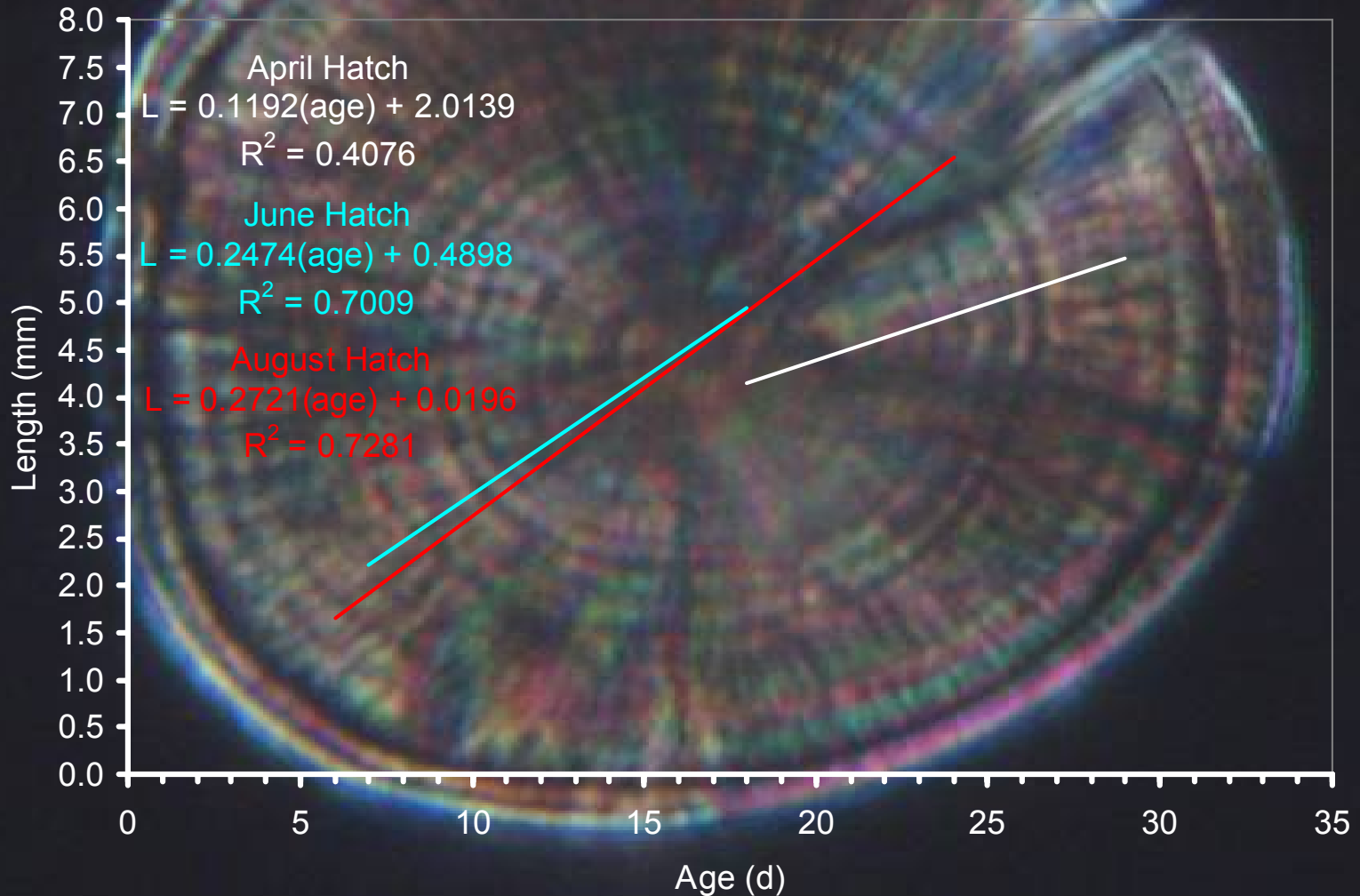
Yellowfin Croaker Spawning Seasonality



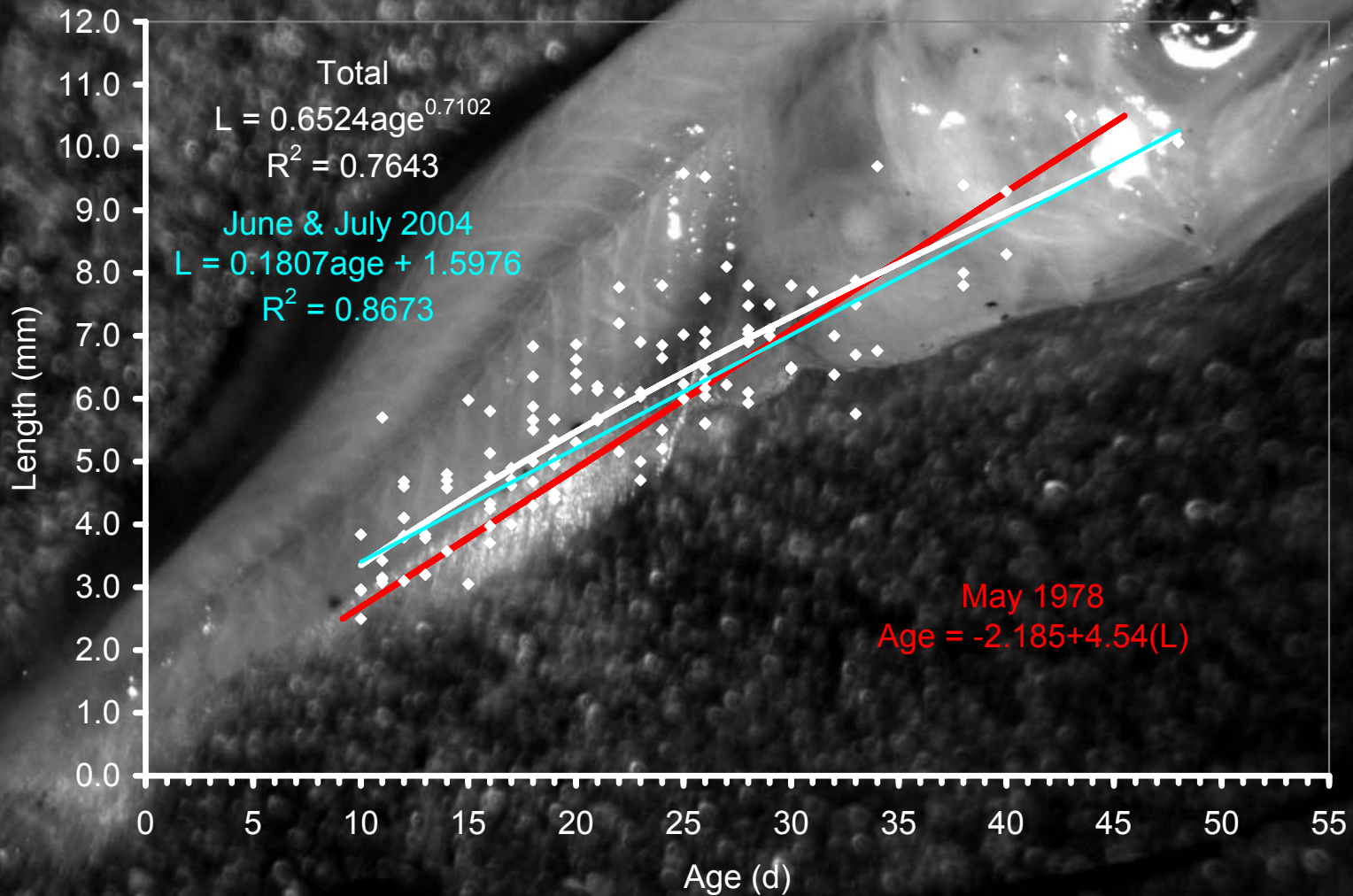
Spotfin Croaker Daily Growth



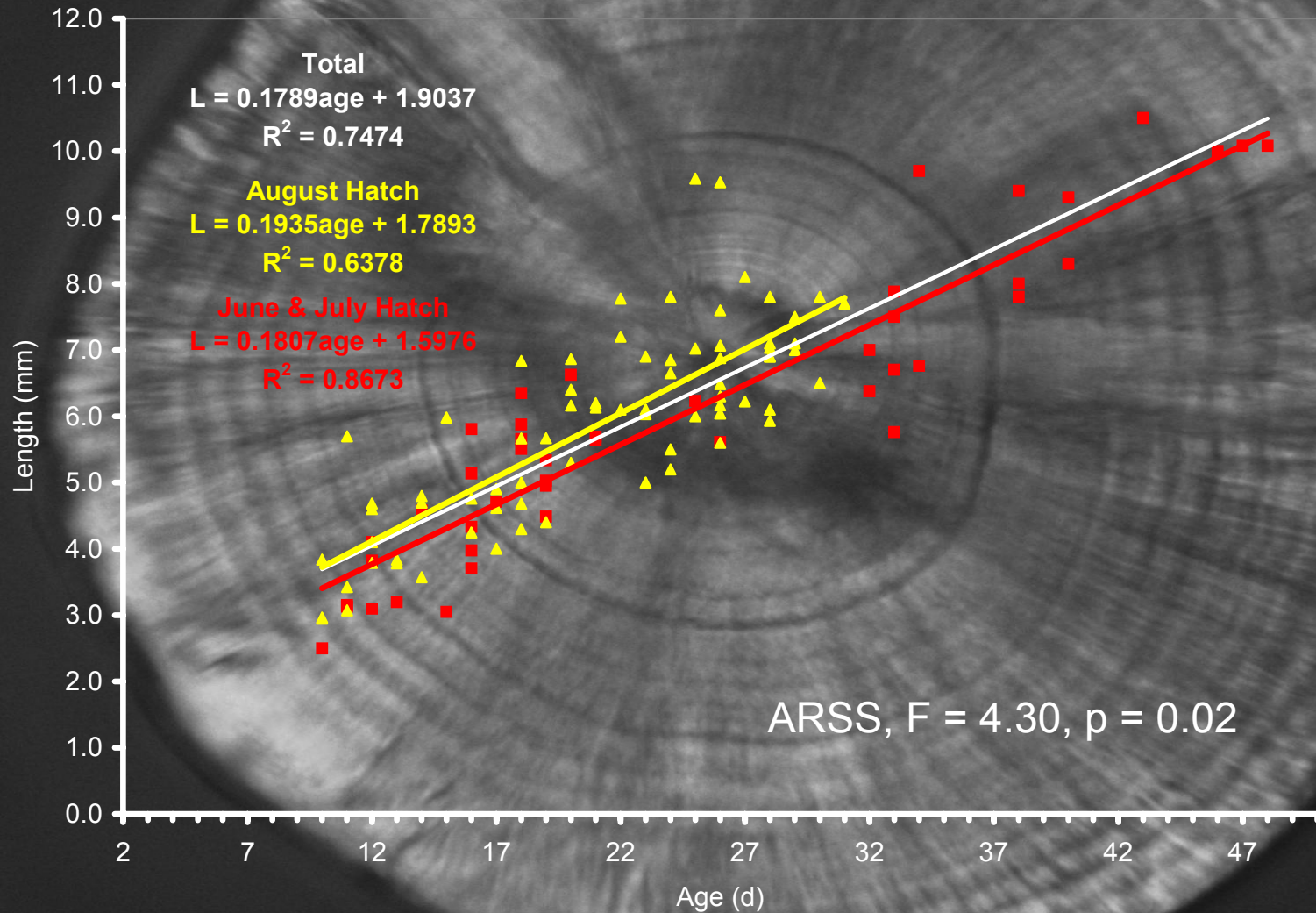
Spotfin Croaker Seasonal Growth



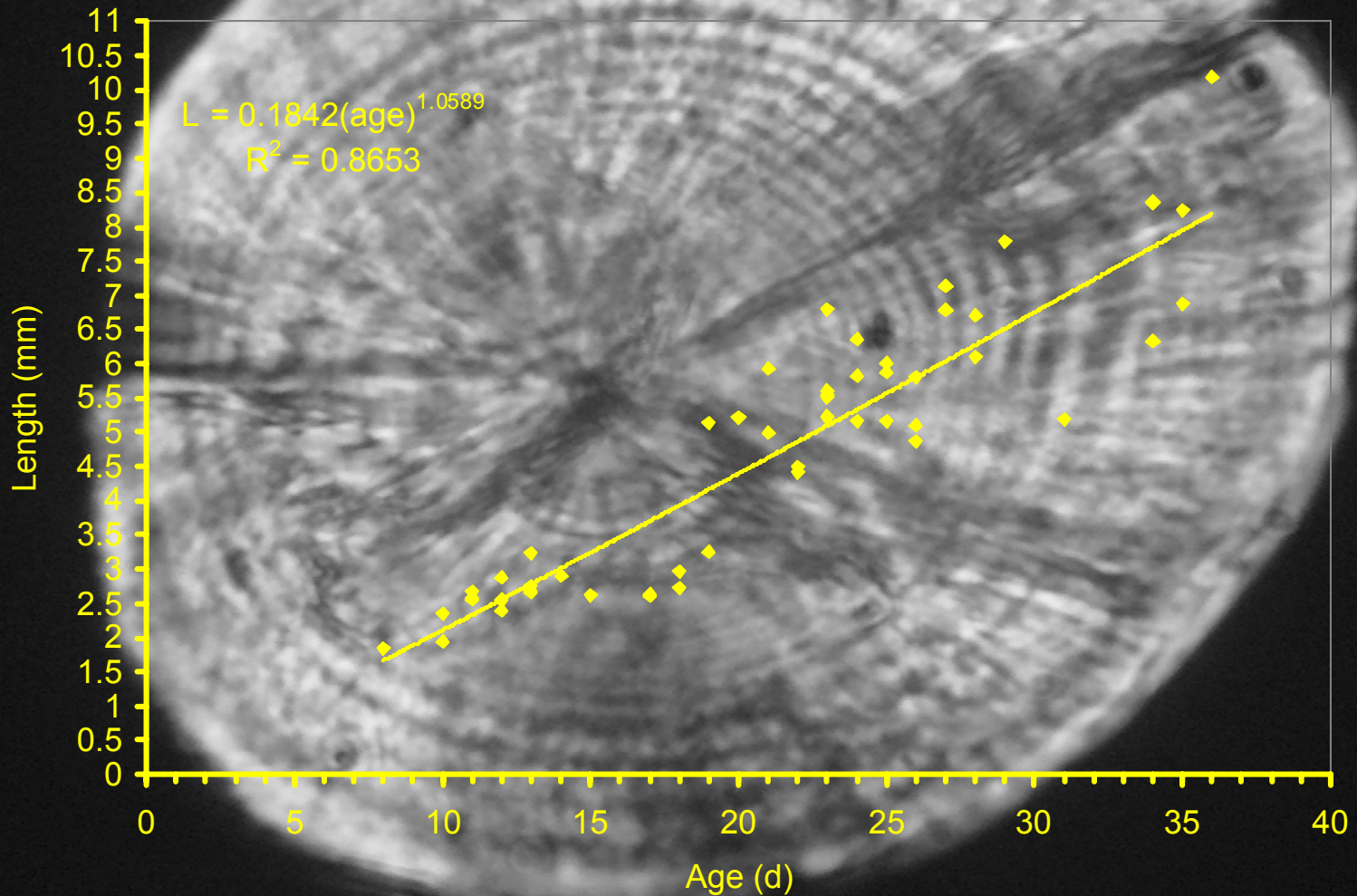
Queenfish Daily Growth



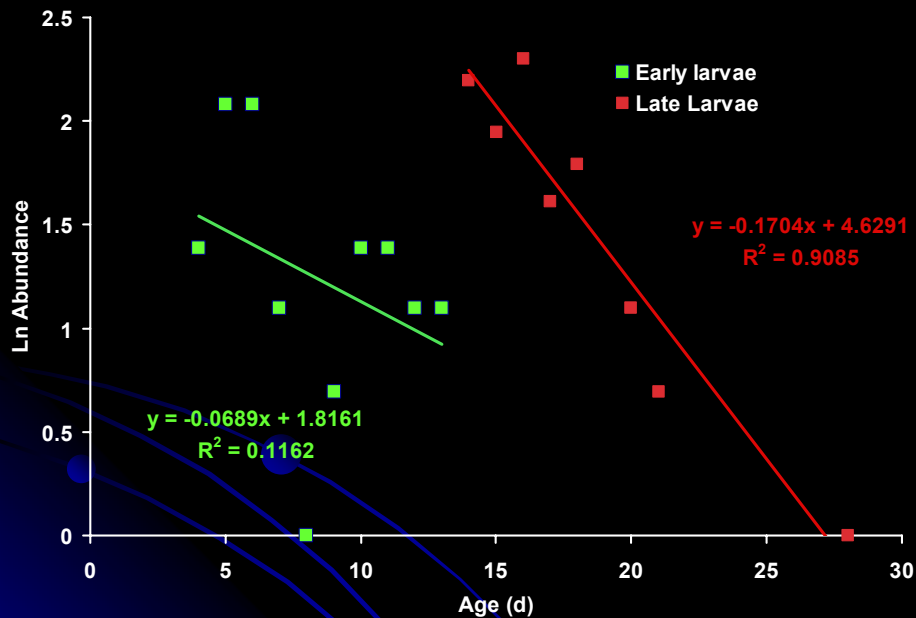
Queenfish Seasonal Growth



White Croaker Daily Growth



Spotfin Croaker Mortality



- Shift in predators, prey, or habitat usage may cause a higher mortality rate around 15 days old?
- Oblique tows may not capture larger larvae that may have already settled near the bottom

Summary

- Adult

- Age and Growth

- Yellowfin Croaker

- To 15 years
- $L_{\infty} = 307.75$, $k = 0.278$, $t_0 = -0.995$
- Recruitment in general decline Bight-wide

- Queenfish

- To 12 years
- $L_{\infty} = 181.122$, $k = 0.27$, $t_0 = -1.480$
- Population in decline since mid-1980s
 - Poor recruitment and larval production

Summary

- Adult
 - Fecundity
 - Spotfin croaker
 - $BF = 2E-07SL^{5.0109}$
 - 35,169 - 640,703 eggs
 - Yellowfin croaker
 - $BF = 31658e^{0.0066SL}$
 - 99,259 – 405,967 eggs
 - Spawning Seasonality
 - Summer spawner, principally in July
 - Finished by September

Summary

- Early Life History

- Spotfin croaker

- Seasonally dependent growth rate
 - Highest in late summer

- Queenfish

- Growth consistent with previous unpublished work
- Seasonally dependent growth rate
 - Higher in summer than spring

- White croaker

- Growth rate consistent with spotfin and queenfish

Peer-Reviewed Literature Developed

- Papers in Press
 - Pondella, D. J. II, J. T. Froeschke, L. S. Wetmore, E. Miller, C. F. Valle, and L. Medeiros. in press. Demographic parameters of yellowfin croaker, *Umbrina roncadore*, (Perciformes:Sciaenidae) from the southern California Bight. Pacific Science.
- Paper in Review
 - Batch fecundity and spawning seasonality of yellowfin croaker (*Umbrina roncadore*. Sciaenidae) from southern California. CalCOFI Reports.
 - Batch fecundity of spotfin croaker (*Roncadore stearnsii*) from southern California. Ciencias Marinas.
- Papers in Preparation
 - Life history, ecology, and long-term demographics of queenfish (*Seriphus politus*) from southern California.
 - Daily growth patterns and ecology of two larval sciaenids, queenfish (*Seriphus politus*) and white croaker (*Genyonemus lineatus*), offshore of Huntington Beach, California.
 - The life history of spotfin croaker (*Roncadore stearnsii*) within the Southern California Bight, a cradle to grave perspective.

Recommended Future Research

- Continue life history studies to expand modeling potential
 - Early life history
 - New stratified sampling to allow for mortality calculation
 - One set of sampling stations in Santa Monica Bay (3 powerplants), one near LA/OC border in San Pedro Bay (4 powerplants)
 - Area covered by SCCOOS surface current mapping or deploy ADCP
 - Concentrate on spring/summer to maximize effort
 - Candidate species: garibaldi, black croaker, white seabass, California corbina, yellowfin croaker, salema, *Paralabrax* spp, silversides, California halibut, Pacific pompano
 - Adult life history studies
 - Age and growth on understudied forage and/or fishery species that are impinged/entrained
 - Fecundity studies
 - Candidate species: silversides, California corbina, Pacific pompano, black croaker, salema
- Dual Function for this data: Inform CWIS assessment and MPA Process

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