

# A World-Class Black Bass Fishery – Adult Largemouth Size and Growth in the Sacramento-San Joaquin Delta



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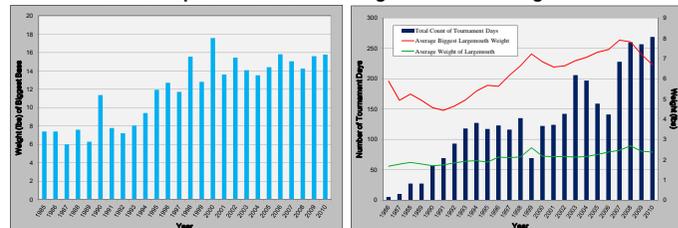
## Research Objectives:

- Utilize adult largemouth bass from Sacramento-San Joaquin Delta tournaments to collect data on age and growth through the non-lethal method of scale collection.
- Initiate a more comprehensive data set on the age and growth rates of adult largemouth bass in the Sacramento-San Joaquin Delta.
- Investigate whether the relatively large body sizes of largemouth bass in the Delta may be due to increased growth rates and/or longevity.

## Background:

- The increase and success of the largemouth bass in the central, southern, and eastern regions of the Sacramento-San Joaquin Delta is part of an overall shift in the littoral fish assemblages.
- Annual tournament reports submitted to the California Department of Fish and Game (CDFG) show a notable increase in Delta tournament popularity, average weight of the biggest largemouth bass, and average weight of largemouth bass weighed in during each tournament.

### CDFG Reported Tournament Largemouth Bass Weight Data

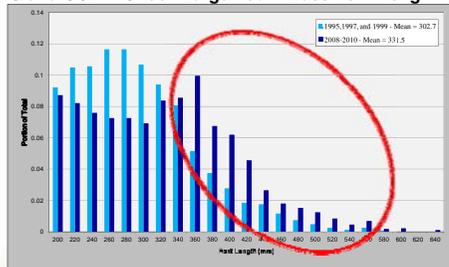


### CDFG Largest Tournament Bass in California 1986-2010

Year	Location	Date Caught	Species	Weight (lbs)
1986	Clear Lake	6/16/1986	Largemouth	12.89
1987	Lake Castaic	6/8/1987	Largemouth	17.90
1988	Lake Cachuma	3/19/1988	Largemouth	18.40
1989	Lake Castaic	6/10/1989	Largemouth	13.00
1990	Lake Castaic	9/19/1990	Largemouth	16.80
1991	Clear Lake	6/1/1991	Largemouth	15.35
1992	Lake Castaic	6/20/1992	Largemouth	17.67
1993	Lake Castaic	6/20/1993	Largemouth	18.28
1994	Lake Castaic	4/30/1994	Largemouth	18.47
1995	Lake Castaic	8/10/1995	Largemouth	13.71
1996	Lake Shasta	1/10/1996	Largemouth	16.30
1997	Lake Hodges	9/27/1997	Largemouth	16.50
1998	Lake Shasta	11/19/1998	Largemouth	18.56
1999	Lake Castaic	6/19/1999	Largemouth	14.74
2000	CA Delta	4/26/2000	Largemouth	17.87
2001	Lake Perris	1/11/2001	Largemouth	14.64
2002	Lake Castaic	6/10/2002	Largemouth	16.56
2003	CA Delta	4/13/2003	Largemouth	14.88
2004	Lake Castaic	6/10/2004	Largemouth	14.78
2005	Lake Shasta	10/9/2005	Largemouth	18.54
2006	CA Delta	4/16/2006	Largemouth	18.61
2007	Lake Perris	4/27/2007	Largemouth	16.40
2008	CA Delta	4/26/2008	Largemouth	14.38
2009	CA Delta	4/11/2009	Largemouth	18.89
2010	New Market Reservoir	3/20/2010	Largemouth	18.11

- Since 2000, the Sacramento-San Joaquin Delta has produced the biggest largemouth bass weighed in annually for all reported CDFG tournaments five times.

### CDFG and UCD E-Shock Largemouth Bass Fork-Length Data



- Electro-shocking data from the 1990s Delta resident fish study compared with similar studies in the 2000s show an increased abundance in the number of largemouth bass with a fork length > 360mm.

## Methods:

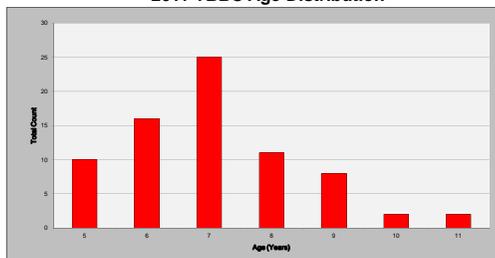
- Collected 5-10 scales from 75 adult largemouth collected at the 2011 Yamamoto Big Bass Challenge (2011 YBBC).
- All scales were collected from behind the pectoral fin to avoid collection of regenerated scales.
- Scales were cleaned, pressed between two slides, and pictures were taken using a dissecting microscope.
- The aging and growth rates were calculated using ImageJ coupled with an increment macro.
- Three independent readers aged 4 scales from each fish to create an average.
- The Fraser Lee Method was used to back-calculate length-at-age.



## Results:

- Of the 75 adult largemouth bass weighed in at the Big Bass Challenge all were more than 5 years old and more than half were 7 years old.

### 2011 YBBC Age Distribution



### Biggest Bass of the 2011 YBBC – TL = 24.8 in. Weight = 10.26 lbs

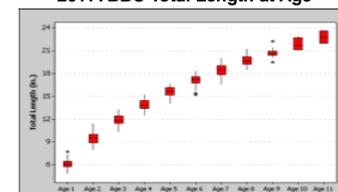


### 1980s, 1990s, and 2000s Mean Fork lengths (mm) at Age

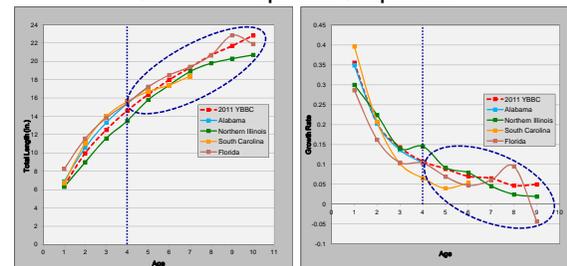
YOY	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11
1980-1984	86 (n)	179 (n)	248 (11)	311 (n)	354 (n)	389 (11)	388 (n)	431 (n)			
1995 & 1997	78 (11)	178 (n)	248 (14)	314 (n)	363 (n)	389 (11)	463 (n)	453 (n)			
2011 YBBC		155 (n)	241 (n)	303 (n)	354 (n)	435 (n)	468 (n)	500 (n)	525 (11)	552 (n)	579 (n)

- The length-at-age comparisons of our 2011 YBBC growth analysis data with 1980s and 1990s CDFG data, suggest that Delta largemouth bass have increased growth rates at an older age, though lack of data from older age classes in previous years prevents a full comparison.

### 2011YBBC Total Length at Age



### Growth Rate Population Comparisons



- Length-at-age data show that largemouth bass in the Delta continued to grow after age 4 at a faster rate when compared to largemouth bass of the same age from our comparison populations.

## Discussion:

- Based on our scale aging results from the 75 largemouth bass collected in 2011, it seems as though Delta largemouth bass exhibit an above average growth rate after the age of 4 years old.
- Even though Delta largemouth are of an unknown hybrid Northern and Florida genetic strain, their growth rates seem to rival that of the pure Florida strain largemouth bass.
- The increased growth rate of adult Delta largemouth could also be attributed to improved habitat suitability, including: 1) reduced velocity, 2) improved water clarity, and 3) prey availability.

## Next Steps:

- Analyze recently collected otoliths and scales from adult largemouth bass in the same age-class to validate our aging analysis.
- Seek funding to analyze several genetic samples to find out the quantity of Florida-strain alleles in Delta largemouth bass.
- Continue the assessment of ages and growth rates of Delta largemouth bass to understand how the ages, growth rates and size distributions of largemouth bass in the Delta compare with other populations.

## Acknowledgements

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