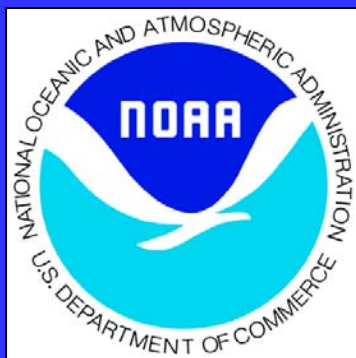


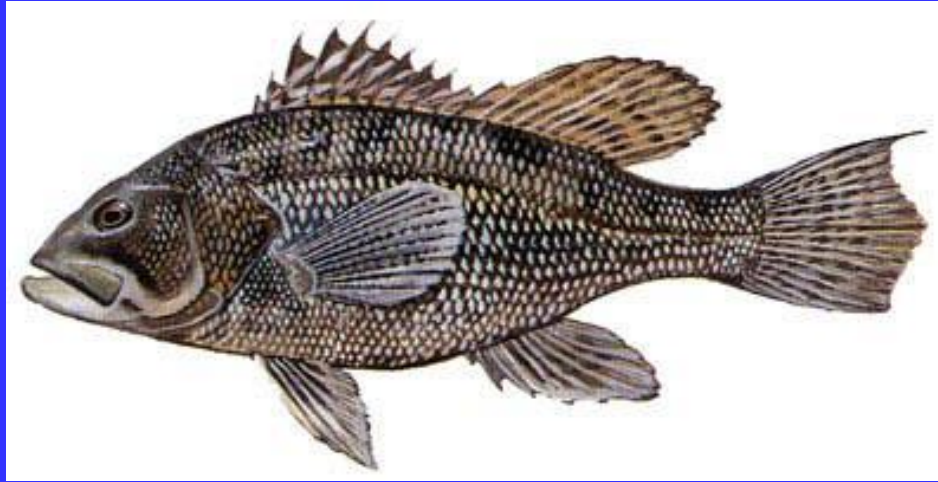
Analysis of the Niche Restaurant Market for Farm-Raised Black Sea Bass, *Centropristis striata*, in North Carolina



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Black Sea Bass (BSB)



fishbase.org

- **Commercially important seafood species**
- **2006 commercial landing value of over \$1.7 million (NCDMF)**
- **Not currently farm-raised on commercial scales for retail use**
- **High retail demand and value**
- **Southern stock is considered overfished (NOAA 2007)**
- **Northern stock is a species of concern (NOAA 2007)**
- **Increased commercial restrictions limit size and total catch**

Project Objective

- **Characterize the potential market for FARM-RAISED BLACK SEA BASS in the upscale, gourmet restaurant niche market of North Carolina.**



- **Seasonal variability**
- **Demand**
- **Volume**
- **Geography**
- **Preparation style (whole/fillet)**
- **Customer preferences (fat content, etc)**
- **Comparable/substitute species**

BSB Production Methods

- **BSB were spawned, reared as larvae and grown-out to market size at the UNCW aquaculture facility in Wrightsville Beach, NC**
- **BSB were grown-out in two near-commercial scale recirculating aquaculture tanks**
- **BSB were fed twice daily, 6 days per week to apparent satiation**
- **Growth monitoring data showed that BSB reached early market sizes of 567g (1.25 lbs) at about 16 months**



Methodology

- Restaurants were randomized and divided into 3 strata in NC: western, central and eastern
- Restaurants meeting our niche market requirements were identified and provided fresh, chilled whole farm-raised BSB. Niche criteria:
 1. Serves seafood
 2. Is not a buffet
 3. Average dinner entrée price \geq \$12
- Participating restaurants were provided 1-6 fresh, chilled whole BSB
- Chefs prepared BSB in styles of their choosing and completed a survey
- Price scenarios: Same as substi. spp., +20%, -20%
- Survey responses were characterized using regression analyses

Survey Response Data

- 129 total restaurants contacted
- 78 total participating restaurants (60%)
- Western: 29 surveys, 44 contacted (66%)
- Central: 22 surveys, 47 contacted (47%)
- Eastern: 27 surveys, 38 contacted (71%)



goal: 30 restaurants
per region

BSB Product Attribute Ranking Results

- Ranking Scale: 1-10, 10 very important
- Freshness, taste, chilled product, size and continuous availability had mean importance rankings ≥ 8.0
- Farm-raised mean ranking of 3.8
- Wild-caught mean ranking of 4.1
- Snapper and Grouper most commonly cited substitute species
- Least important attributes included nutritional labeling, live product, certificate of origin promotion with mean rankings ≤ 2.96
- Western (6.62) and central (6.00) region preferred organic availability more than eastern restaurants (3.71)
- Fat content of ave importance (5.96)

Regression Model

Explaining pounds purchased per month

$$\begin{aligned} \text{pounds}_{i,t,s} = & \beta_0 + \beta_1 \text{springd} + \beta_2 \text{falld} + \beta_3 \text{winterd} \\ & + \beta_4 \text{bsbprice}_{i,t,s} + \beta_5 \text{bsbprsq}_{i,t,s} + \beta_6 \text{sprice}_{i,t} \\ & + \beta_7 \text{spricesq}_{i,t} + \beta_8 \text{seatcap}_i + \beta_9 \text{entreepr}_i + \beta_{10} \text{entreeprsq}_i \\ & + \beta_{11} \text{fsh int ns}_i + \beta_{12} \text{avalprob}_i + \beta_{13} \text{seasonal}_i + e_{i,t,s} \end{aligned}$$

where:

i indexes restaurant

t indexes time of year

s indexes price scenario

Example Scenario

- Summer season
- Substitute fish = grouper @ \$7.50/lb
- BSB price = \$7.50
- All other variables = mean values

18.35 lbs/month/restaurant purchased

Similar scenario for year-round, all seasons demand:
Estimated statewide BSB demand = 394,798 lbs/yr

NC Market Study Conclusions

- Average of 18.35 lbs purchased per month per restaurant
- Estimated statewide demand is 394,798 lbs./year
- Statewide demand would support 7-8 farms @ 50,000 lbs./yr
- Snapper/Grouper are substitute species
- Rest. w. higher entrée prices purchase more BSB
- BSB attributes most important to buyers were freshness, chilled product, size and continuous availability
- Little preference for wild-caught BSB over farm-raised
- Pounds purchased in winter season lower than other seasons

Analysis of niche market demand for farm-raised Black Sea Bass, *Centropristis striata*, in four major U.S. metro cities: Philadelphia, New York City, Atlanta and San Francisco



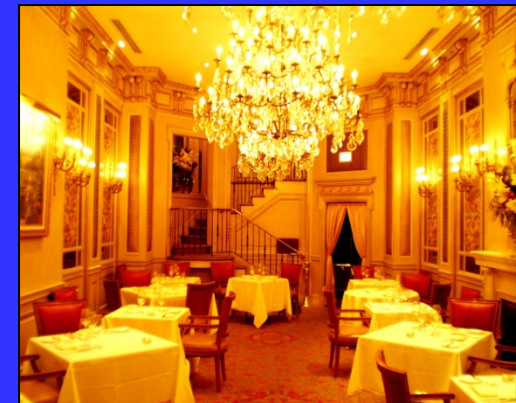
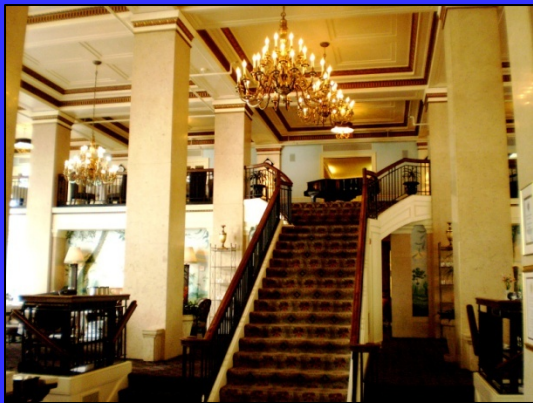
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Sampling and response rates

	Seafood /sushi restaurants per city	Estimated restaurants in niche	Restaurants in niche contacted	Sampling rate	Restaurants refusing	Restaurants participating	Response rate
Phila.	490	91	40	44%	10	30	75%
NYC	857	306	54	18%	24	30	56%
Atlanta	653	87	38	44%	8	30	79%



Buyer product preferences

All three cities agree:

- Most important product attributes are freshness, availability, size.
- Least important are live product, nutritional labeling and empty GI tracts
- Snapper and grouper are most comparable to BSB
- Prefer fresh, chilled BSB that are ≥ 1.5 lbs with moderate to high fat content
- No interest in frozen BSB product

Responses varying by city:

- Philadelphia and NYC show interest in 1.0 lb BSB products whereas Atlanta does not
- Philadelphia and NYC commonly compare BSB to striped bass but not one Atlanta restaurant did this
- Atlanta restaurants show preference for domestic seafood
- Within Philadelphia and NYC, seafood suppliers are frequently shared among restaurants whereas Atlanta suppliers are much more varied

Multiple regression models

$$\begin{aligned} \text{pounds}_{i,t,s} = & \beta_0 + \beta_1 \text{springd} + \beta_2 \text{falld} + \beta_3 \text{winterd} \\ & + \beta_4 \text{bsbprice}_{i,t,s} + \beta_5 \text{bsbprsq}_{i,t,s} + \beta_6 \text{sprice}_{i,t} + \beta_7 \text{spricesq}_{i,t} \\ & + \beta_8 \text{seatcap}_i + \beta_9 \text{entreepr}_i + \beta_{10} \text{entreeprsq}_i + \beta_{11} \text{avalprob}_i \\ & + \beta_{12} \text{phillyd} + \beta_{13} \text{atlantad} + e_{i,t,s} \end{aligned}$$

- Pounds per restaurant per month
- Season
- BSB price
- Substitute species price
- Seating capacity
- Entrée price
- Has experienced problems with availability of BSB
- City

PRICE SCENARIOS

- BSB price is **equal to** substitute species price
- BSB price is **20% less** than substitute species price
- BSB price is **20% more** than substitute species price

Example scenario:

NYC Niche Market

Suppose BSB price is equal to snapper price at \$5.39/lb

- 29.6 mean lbs BSB per month per niche restaurant
- 354.7 mean lbs BSB per year per niche restaurant
- 306 estimated number of NYC restaurants in niche
- 108,540 mean lbs per year demand from NYC niche restaurants

Conclusions and future considerations

- Philadelphia, NYC and Atlanta each have large populations of upscale seafood and sushi restaurants
- Geographical location of cities influence individual BSB markets differently
- Increasing BSB prices and spring, fall and winter seasons reduce BSB demand
- Hypothetical BSB purchases increase with seating capacity
- Promising implications for BSB aquaculture include market preferences for freshness, higher fat contents, and an interest in 1.0 lb BSB products
- Currently seeking funding to assess European and Asian markets for export
- Further studies must be conducted to evaluate commercial-scale shipping, transit and logistics for industry development
- Continued efforts toward improving growth rates via diet, nutrition and manipulation of photothermal regimes are imperative
- “New” farm-raised black sea bass markets may soon include organic products and corporate branding