‘OUR TABLES HAVE SUFFERED’: QUANTIFYING CONSUMER MARKET ACTIVITY OF COMMERCIALLY VALUABLE LIVING RESOURCES IN CHESAPEAKE BAY, 1850-1950

An Undergraduate Research Scholars Thesis

by

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ABSTRACT

‘Our Tables Have Suffered’: Quantifying consumer market activity of commercially valuable living resources in Chesapeake Bay, 1850-1950. (May 2013)

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Once the most productive and economically important estuary in the US, Chesapeake Bay remains in poor condition after years of over-harvesting and pollutant run-off. The objective of this study was to quantify the demand and supply of historically important commercial species and their decline and/or withdrawal from food markets for periods prior to the 1950 establishment of NOAA fisheries catch data. We examined data sources, including historical newspapers, price current lists, and menus to capture market trends of seven important species: Diamondback terrapin, Canvasback duck, American shad, Striped bass, Bluefish, Blue crab, and oysters. Increases in market values were observed between 1850 and 1950 for all species. The prices of terrapin and Canvasback duck escalated dramatically during the early 1900s as these items grew in restaurant popularity. These two items all but disappeared from markets and menus with the passing of the Migratory Bird Treaty Act of 1918 and Volstead Act of 1920. The market for Shad climaxed between 1910 – 1920 before stock declines, dam engineering, and

pollution reduced these fish from markets in the region. Bluefish, Striped Bass, and Blue crab fisheries remain relatively healthy but have all shown cyclical declines over this period. Oyster prices have remained steady with the national inflation rate; however, menu prices have steadily increased steadily since the 1950s. This study, the first of its kind, demonstrates the utility of menu and market prices for reconstructing consumer-driven market behaviors of commercially valuable species for periods prior to the establishment of the NOAA databases: an important tool in determining pre-disturbed natural baselines.

ACKNOWLEDGEMENTS

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NOMENCLATURE

AAS	American Antiquarian Society
TAMUG	Texas A&M University at Galveston
CPI	Consumer Price Index
NYPL	New York Public Library
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ASMFC	Atlantic State Marine Fisheries Commission
GIT	Goal Implemented Team
CBSAC	Chesapeake Bay Stock Assessment Committee
$/lb	Price per pound
$/dozen	Price per dozen
$/oyster	Price per oyster
$/barrel	Price per barrel
$/100	Price per 100 units
$/each	Price per each unit

CHAPTER I

INTRODUCTION

Evidence suggests that earlier stocks of marine food resources, untouched by anthropogenic harvesting, may have been an order of magnitude greater than stock levels of the last century (Steele 2000). In order to devise methods to restore over-harvested and depleted stocks of living marine resources, scientists must first identify the natural baselines of formerly pristine environmental conditions (Jackson et al. 2001). To address these problems scientists are finding new ways to exploit data from many disciplines, such as paleoecological, archaeological, historical, and ecological records to illustrate the shifts from once natural trophic baselines of commercially productive systems (Jackson et al. 2001). This study demonstrates the utility of never-before examined data sources, including historical newspapers, periodicals, price current lists, and restaurant menus to quantify the retail and wholesale market trends of several taxa important to the Chesapeake Bay ecosystem and seafood supply – Diamondback terrapin, Canvasback duck, American shad, Striped bass, Bluefish, Blue crab, and oysters. In the late nineteenth and early twentieth centuries these species formed a large part of the commercial catches in the Chesapeake and adjoining tributaries and were of great economic importance to fishing industries of the region. In recent years, a multispecies approach to fisheries management, has been taken to accommodate species management and conservation goals, such as the preservation of local endemics, making it useful for prioritizing management actions (Brook 2002). When exploited on a commercial and/or large recreational level, consideration must be afforded to the effects not only on the targeted species, but also on the ecosystem. Typically if one species is removed, its predators presumably have less food, and other prey items experience reduced mortality, as can be shown in some cases in the early Chesapeake Bay

fisheries of the last century (Miller et al. 2006). These changes can alter the population dynamics of an individual species and overall community structure, thus changing the health of a fishery and the market(s) it supplies (Miller et al. 2006).

Significance of this Study

Historically, the first living resources to be affected by human-induced changes have been those found in estuary systems and near-shore coastal waters (Lotze et al. 2006; Lotze 2010). Once the most productive and economically important estuary in the US, the Chesapeake Bay and its adjacent tributaries remains in poor condition after years of over-harvesting and pollutant run-off (e.g. Rothschild et al. 1994; Kirby, 2004, Lotze 2010). At peak production the bay was a significant source of marine fisheries, but has drastically declined since the 1850s. Databases are now being constructed that feature digitized menus, newspapers, price current lists, and periodicals – from which market wholesale and menu prices may be obtained. As these and other living marine resources are exhausted to supply an ever-growing demand, scientists around the world have raised efforts to resolve this issue. Novel research methods such as these demonstrated here, may well elucidate explanations for the decline of wild stocks of popular seafood items prior to 1950 and reveal standing stock levels closer to that of natural baseline stock abundances before industrial-scale harvesting. Thus, this research emphasizes the goal to enhance the knowledge and understanding of how the diversity, distribution and abundance of marine life has changed over the long term.

Approach

Price data for Chesapeake marine resources was collected from historical sources that included menus, newspapers and periodicals from the 1850s to the 1960s. Historically important commercial species were selected that vary based on taxa and trophic level and peak production period – Diamondback terrapin, Shad, Striped bass, Bluefish, Canvasback duck, Blue crab and oysters. The objective was to gather quantitative evidence for the demand and supply of each species and explain their market behavior withdrawal from food markets for periods prior to the establishment of the commercial fisheries catch and/or data reported by the *National Marine Fisheries Service* (NMFS), which only extends from 1950 to present. Given historical declines in stock abundances, it can be hypothesized that this relative decrease in supply was likely due to the over-harvesting and/or demand outcompeting the supply of such food products. As a result, the menu items containing these sources will reflect the decrease in supply and increased demand as prices rise faster than the *Sahr Consumer Price Index* (CPI) inflation rate of the time (Sahr 2010).

Previous studies have used nontraditional datasets to study pre-1950 marine ecological systems including — menus (Jones 2008), fishery logbooks (Alexander's 2009), and cookbooks (Levin and Dufault's 2010). Menus, or bills of fare, debuted in the US during the 1820s and became widespread by the 1850s (Jones 2008). Ephemeral by design, they are typically discarded and replaced by a new menu. Those that have survived can now serve new purpose as a source of never-before examined price data for the items they feature. Jones (2008) demonstrated the use of these documents to determine the market behavior of – Canvasback duck, Abalone, and American lobster – and normalizing the prices found by using the appropriate CPI inflation-

adjustment factor. A search for historic menus undertaken in 2001 found over 200,000 menus archived in libraries and historical societies across the U.S; the largest collections being held at the New York Public Library (approximately 35,000 menus), the New York Historical Society (approximately 25,000), the Johnson and Wales Culinary Archives (approximately 50,000) and the Culinary Institute of America (approximately 30,000). Approximately 5% of these were useful for this study, and many have been collected or photo-copied by Jones while others are available digitally.

Limitations

The resources from which market and wholesale prices were obtained are by nature ephemeral objects that were typically discarded once the goods they advertise have been consumed (Jones 2008). This fact has contributed to the scarcity of these items, making them difficult to come by and in turn sometimes difficult to supply information to fill large gaps in years for some of the species investigated. In some cases, patrons and collectors saved menus, perhaps as mementos of a special event or for the attractive artwork featured on the cover. As such, many of these menus were saved and have found their way into the above mentioned public and institutional archives; from which they can be retrieved and information they hold gathered for the purpose of this study (Jones 2008). Even more uncommon are the price current lists; featured almost daily in newspapers, these lists of wholesale market prices can at times provide the best information because the items they advertise are sold in bulk, unprocessed. Price current lists are limited within themselves to common items sold daily, making it difficult to pursue less common items such as the Diamondback terrapin and Canvasback duck. Being that the articles, periodicals, menus and price current lists are digitized from historical menus, once downloaded, they may be difficult to interpret because of low visual quality. The items may have been damaged prior to the digital replication or the text became blurred during the process.

CHAPTER II

METHODS

Recent character recognition software and digitization techniques allow databases of primary source collections like newspaper archives and menus to be made usable for scientific research. This new information has potentially limitless applications and can supply useful price data for time-series economic analyses. This price data can be utilized to create price indices for several economically valuable species advertised on menus, prices current lists, and newspaper bulletins and chart the market behavior over a given period. Of the seven species documented here, five – Shad, Striped bass, Bluefish, Blue crab and oysters – demonstrate a continued presence on menus, price current lists and newspapers from 1850 to 1950 and onward. Two – Diamondback terrapin and Canvasback duck – disappeared from these documents by the early-1900s. As a baseline, documentation of NMFS fisheries catch data began in 1950; data for these fish species are well represented by this catch data beyond 1950 and a sizeable amount of data exists prior to this period. In this study, these now historical documents as sources of information for assembling market wholesale and menu item price data for periods prior to 1950. An excel database was assembled which includes: year, source, state of origination, newspaper title/menu title, title of article/restaurant, units sold, and wholesale/retail market for each item.

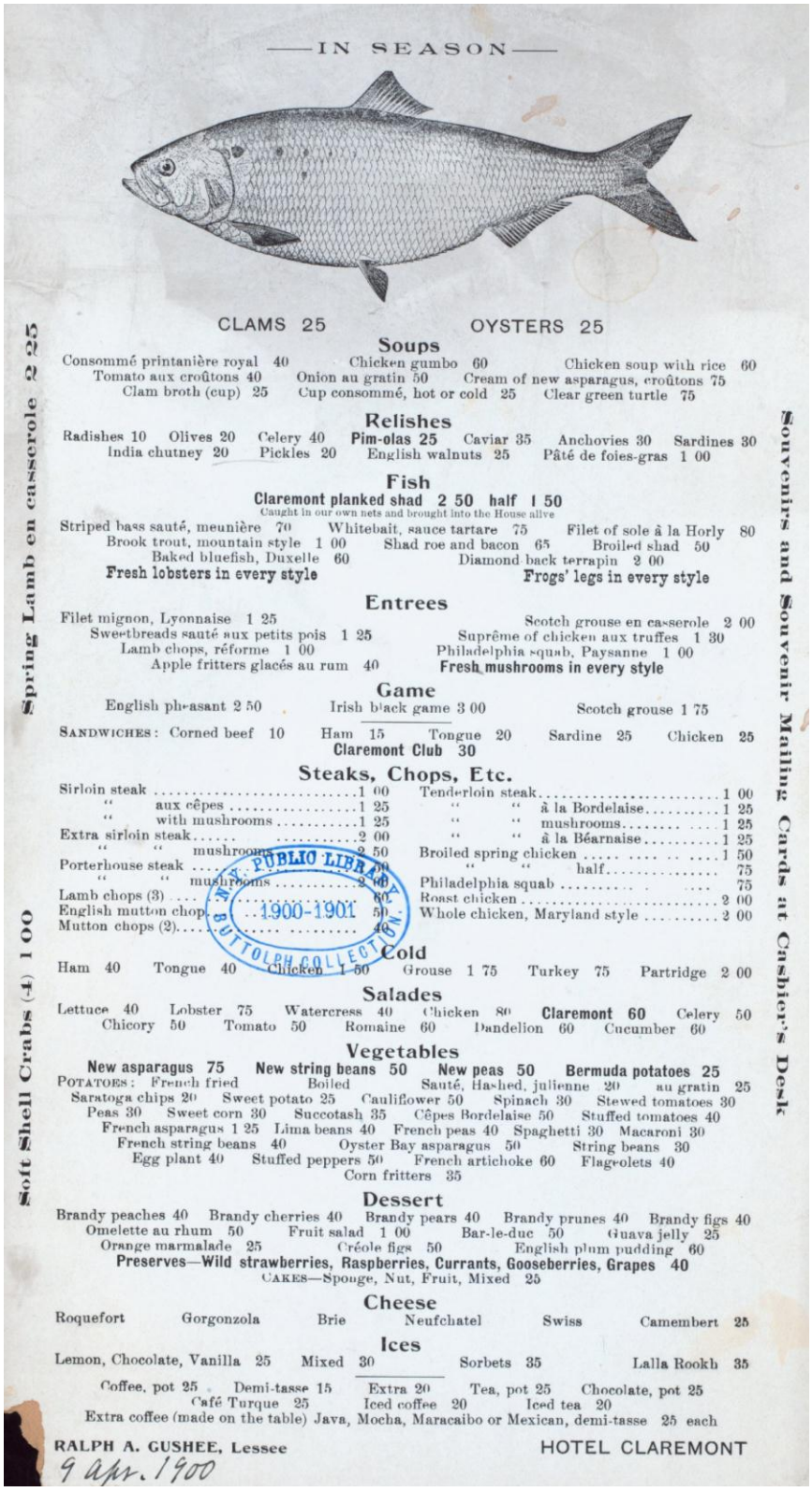
Data Collection

Analysis of Menus

For this study, menus were obtained from one online database at the NYPL, two photocopied collections from the NYPL and AAS, and the private collection of Dr. Jones. Of these collections, menus were classified into one of three types based on the content, state of sale, and

restaurant price bracket. First, the hotel bill of fare, which traditionally listed the food items offered daily in a hotel; however, since the meal was included in the price of the room prices are not presented in most cases. Contrary to this, many of the menu prices prior to the 1920s are of hotel origin (Figures 1 & 2). Meals prepared for annual meetings of clubs and societies, constitute the second type of menu, the banquet menu, which feature the date of the event and a list of food items served, but no prices are given (Figure 3). Third, and the most useful in this study, is the restaurant menu, which typically specifies the price, as well as the identity of each food item (Figures 4 & 5). In the late 1800s and early 1900s restaurant menus would have been printed daily or weekly and thus often featured the date of sale.

Menus advertising at least one or more entrée dishes containing the species of interest from the 1850s to 1950s were selected according to criteria such as state of origination, price range relative to social strata, dish preparation and included ingredients. States in which the restaurants are located were considered on the basis of proximity to Chesapeake Bay and wholesale and retail markets known to frequent the objective species sourced from the Bay. States considered in this study were limited to New York, Pennsylvania, Virginia, New Jersey, Delaware and Maryland. Bills of fare can also include information on portion size; an important detail when considering the price of a dish. With the exception of oysters, which are most often categorized as a starter or appetizer, only entrée items were selected for more consistent portion size. The nominal prices were converted to real prices (2011$) using CPI adjustment inflation factor of Sahr (2012). These prices in conjunction with concurrent retail and wholesale prices were used to isolate the data trends for market behavior of supply–demand for these resources and demonstrate changes in fishery stock abundance.



—IN SEASON—

CLAMS 25 OYSTERS 25

Soft Shell Crabs (4) 1 00

Spring Lamb en casserole 2 25

Souvenirs and Souvenir Mailing Cards at Cashier's Desk

Soups

Consommé printanière royal 40 Chicken gumbo 60 Chicken soup with rice 60
Tomato aux croûtons 40 Onion au gratin 50 Cream of new asparagus, croûtons 75
Clam broth (cup) 25 Cup consommé, hot or cold 25 Clear green turtle 75

Relishes

Radishes 10 Olives 20 Celery 40 **Pim-olas 25** Caviar 35 Anchovies 30 Sardines 30
India chutney 20 Pickles 20 English walnuts 25 Pâté de foies-gras 1 00

Fish

Claremont planked shad 2 50 half 1 50
Caught in our own nets and brought into the House alive
Striped bass sauté, meunière 70 Whitebait, sauce tartare 75 Filet of sole à la Horly 80
Brook trout, mountain style 1 00 Shad roe and bacon 65 Broiled shad 50
Baked bluefish, Duxelle 60 Diamond back terrapin 2 00
Fresh lobsters in every style **Frogs' legs in every style**

Entrees

Filet mignon, Lyonnaise 1 25 Scotch grouse en casserole 2 00
Sweetbreads sauté aux petits pois 1 25 Suprême of chicken aux truffes 1 30
Lamb chops, réforme 1 00 Philadelphia squab, Paysanne 1 00
Apple fritters glacés au rum 40 **Fresh mushrooms in every style**

Game

English pheasant 2 50 Irish black game 3 00 Scotch grouse 1 75

SANDWICHES: Corned beef 10 Ham 15 Tongue 20 Sardine 25 Chicken 25
Claremont Club 30

Steaks, Chops, Etc.

Sirloin steak 1 00
" aux cêpes 1 25
" with mushrooms 1 25
Extra sirloin steak 2 00
" " mushrooms 2 50
Porterhouse steak 2 00
" " mushrooms 2 50
Lamb chops (3) 60
English mutton chop 50
Mutton chops (2) 40

Tenderloin steak 1 00
" " à la Bordelaise 1 25
" " mushrooms 1 25
" " à la Béarnaise 1 25
Broiled spring chicken 1 50
" " half 75
Philadelphia squab 75
Roast chicken 2 00
Whole chicken, Maryland style 2 00

Cold

Ham 40 Tongue 40 Chicken 1 50 Grouse 1 75 Turkey 75 Partridge 2 00

Salades

Lettuce 40 Lobster 75 Watercress 40 Chicken 80 **Claremont 60** Celery 50
Chicory 50 Tomato 50 Romaine 60 Dandelion 60 Cucumber 60

Vegetables

New asparagus 75 New string beans 50 New peas 50 Bermuda potatoes 25
POTATOES: French fried Boiled Sauté, Hashed, julienne 20 au gratin 25
Saratoga chips 20 Sweet potato 25 Cauliflower 50 Spinach 30 Stewed tomatoes 30
Peas 30 Sweet corn 30 Succotash 35 Cêpes Bordelaise 50 Stuffed tomatoes 40
French asparagus 1 25 Lima beans 40 French peas 40 Spaghetti 30 Macaroni 30
French string beans 40 Oyster Bay asparagus 50 String beans 30
Egg plant 40 Stuffed peppers 50 French artichoke 60 Flageolets 40
Corn fritters 35

Dessert

Brandy peaches 40 Brandy cherries 40 Brandy pears 40 Brandy prunes 40 Brandy figs 40
Omelette au rhum 50 Fruit salad 1 00 Bar-le-duc 50 Guava jelly 25
Orange marmalade 25 Créole figs 50 English plum pudding 60
Preserves—Wild strawberries, Raspberries, Currants, Gooseberries, Grapes 40
CAKES—Sponge, Nut, Fruit, Mixed 25

Cheese

Roquefort Gorgonzola Brie Neufchatel Swiss Camembert 25

Ices

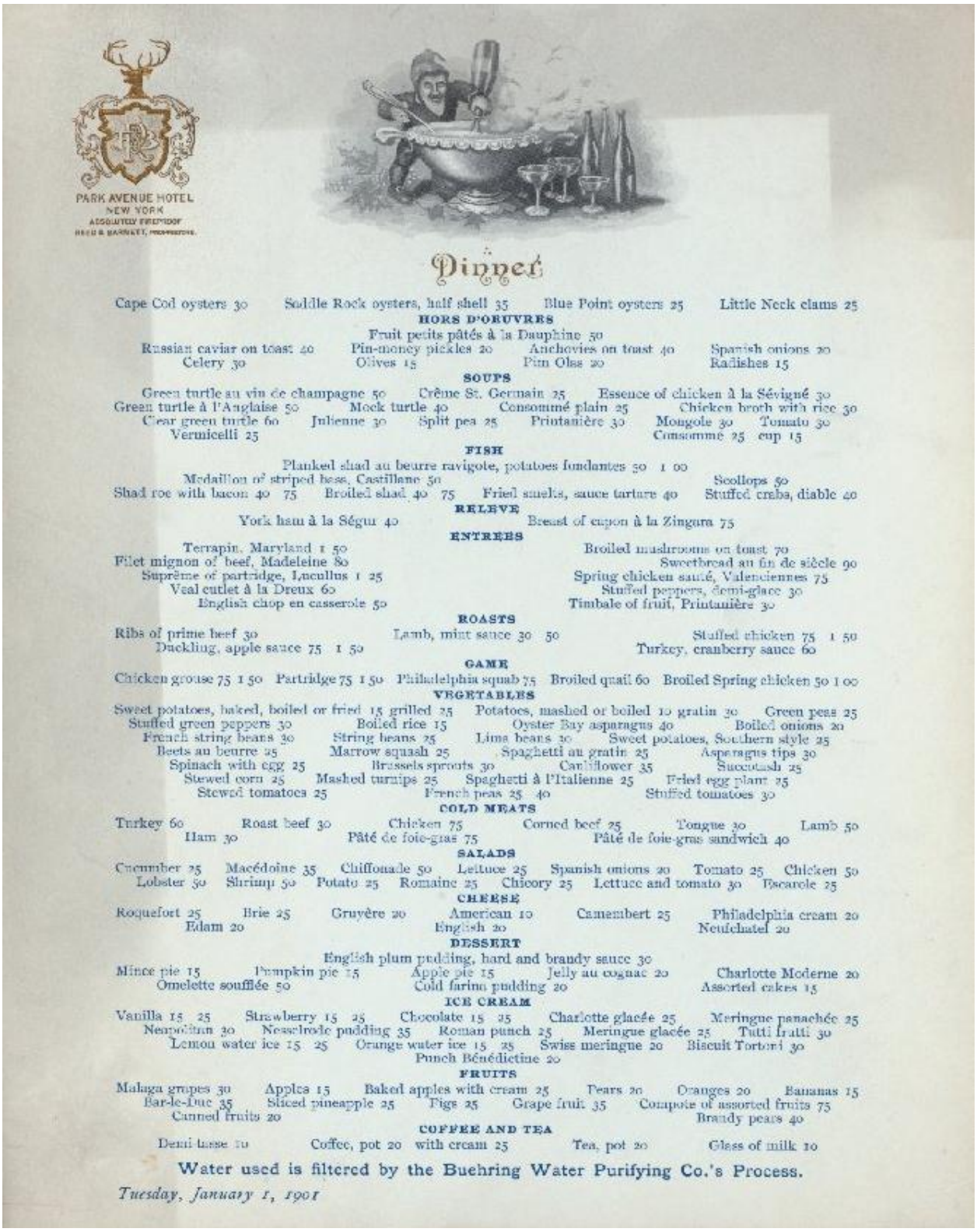
Lemon, Chocolate, Vanilla 25 Mixed 30 Sorbets 35 Lalla Rookh 35

Coffee, pot 25 Demi-tasse 15 Extra 20 Tea, pot 25 Chocolate, pot 25
Café Turque 25 Iced coffee 20 Iced tea 20
Extra coffee (made on the table) Java, Mocha, Maracaibo or Mexican, demi-tasse 25 each

RALPH A. GUSHEE, Lessee HOTEL CLAREMONT

9 apr. 1900

Figure 1 Menu (Bill of Fare) from Claremont Hotel, featuring the artwork of an American Shad, includes the prices of many of the seafood items examined in this study (April 1900).



PARK AVENUE HOTEL
NEW YORK
ABSOLUTELY FIREPROOF
REED & BARNETT, PROPRIETORS.

Dinner

Cape Cod oysters 30 Soldile Rock oysters, half shell 35 Blue Point oysters 25 Little Neck clams 25

HORS D'OEUVRES

Fruit petits pâtés à la Dauphine 50
Russian caviar on toast 40 Pin-money pickles 20 Anchovies on toast 40 Spanish onions 20
Celery 30 Olives 15 Pim Olas 20 Radishes 15

SOUPS

Green turtle au vin de champagne 50 Crême St. Germain 25 Essence of chicken à la Sévigné 30
Green turtle à l'Anglaise 50 Mock turtle 40 Consommé plain 25 Chicken broth with rice 30
Clear green turtle 60 Julienne 30 Split pea 25 Printanière 30 Mongole 30 Tomato 30
Vermicelli 25 Consommé 25 cup 15

FISH

Planked shad au beurre ravigote, potatoes fondantes 50 1 00
Medaillon of striped bass, Castillane 50 Scollops 50
Shad roe with bacon 40 75 Broiled shad 40 75 Fried smelts, sauce tartare 40 Stuffed crabs, diable 40

RELEVE

York ham à la Ségur 40 Breast of capon à la Zingara 75

ENTREES

Terrapin, Maryland 1 50 Broiled mushrooms on toast 70
Filet mignon of beef, Madeleine 80 Sweetbread au fin de siècle 90
Suprême of partridge, Lucullus 1 25 Spring chicken sauté, Valenciennes 75
Veal cutlet à la Dreux 60 Stuffed peppers, demi-glace 30
English chop en casserole 50 Timbale of fruit, Printanière 30

ROASTS

Ribs of prime beef 30 Lamb, mint sauce 30 50 Stuffed chicken 75 1 50
Duckling, apple sauce 75 1 50 Turkey, cranberry sauce 60

GAME

Chicken grouse 75 1 50 Partridge 75 1 50 Philadelphia squab 75 Broiled quail 60 Broiled Spring chicken 50 1 00

VEGETABLES

Sweet potatoes, baked, boiled or fried 15 grilled 25 Potatoes, mashed or boiled 10 gratin 30 Green peas 25
Stuffed green peppers 30 Boiled rice 15 Oyster Bay asparagus 40 Boiled onions 20
French string beans 30 String beans 25 Lima beans 30 Sweet potatoes, Southern style 25
Beets au beurre 25 Marrow squash 25 Spaghetti au gratin 25 Asparagus tips 30
Spinach with egg 25 Brussels sprouts 30 Cauliflower 35 Succotash 25
Stewed corn 25 Mashed turnips 25 Spaghetti à l'Italienne 25 Fried egg plant 25
Stewed tomatoes 25 French peas 25 40 Stuffed tomatoes 30

COLD MEATS

Turkey 60 Roast beef 30 Chicken 75 Corned beef 25 Tongue 30 Lamb 50
Ham 30 Pâté de foie-gras 75 Pâté de foie-gras sandwich 40

SALADS

Cucumber 25 Macédoine 35 Chiffonade 50 Lettuce 25 Spanish onions 20 Tomato 25 Chicken 50
Lobster 50 Shrimp 50 Potato 25 Romaine 25 Chicory 25 Lettuce and tomato 30 Escarole 25

CHEESE

Roquefort 25 Brie 25 Gruyère 20 American 10 Camembert 25 Philadelphia cream 20
Edam 20 English 20 Neufchatel 20

DESSERT

English plum pudding, hard and brandy sauce 30
Mince pie 15 Pumpkin pie 15 Apple pie 15 Jelly au cognac 20 Charlotte Moderne 20
Omelette soufflée 50 Cold farina pudding 20 Assorted cakes 15

ICE CREAM

Vanilla 15 25 Strawberry 15 25 Chocolate 15 25 Charlotte glacée 25 Meringue panachée 25
Neapolitan 30 Nesselrode pudding 35 Roman punch 25 Meringue glacée 25 Tutti frutti 30
Lemon water ice 15 25 Orange water ice 15 25 Swiss meringue 20 Biscuit Tortoni 30
Punch Bénédictine 20

FRUITS

Malaga grapes 30 Apples 15 Baked apples with cream 25 Pears 20 Oranges 20 Bananas 15
Bar-le-Duc 35 Sliced pineapple 25 Figs 25 Grape fruit 35 Compote of assorted fruits 75
Canned fruits 20 Brandy pears 40

COFFEE AND TEA

Demi tasse 10 Coffee, pot 20 with cream 25 Tea, pot 20 Glass of milk 10

Water used is filtered by the Buehring Water Purifying Co.'s Process.

Tuesday, January 1, 1901

Figure 2 Bill of Fare from the Park Avenue Hotel in New York (January 1901).

Menu

STATEN ISLAND ATHLETIC CLUB,

West New Brighton, S. I.

Decennial Celebration.

Cold Salmon Sauce Tartar, 50c.
Soft Shell Crabs, 50c. Pickeled Oysters Marine, 40c.
Sardines, 30c.
Cold Roast Beef, 50c. ½ Spring Chicken, 60c.
Ham, 40c. Tongue, 40c.

SALADS.

Chicken, 50c. Lobster, 50c.
Potato, 15c. Lettuce, 25c.
Tomato, 25c.
Soft Shell Crab Sandwiches, 25c.
Ham, Tongue, Roast Beef Sandwiches, 10.
Neopolitan Ice Cream, 25c.
Assorted Cakes, 10c. Pies, 10c.

FRUITS.

Peaches, Oranges, Pears, Grapes, . 25c.

CHEESE.

Roquefort' 25c. Swiss 25c.

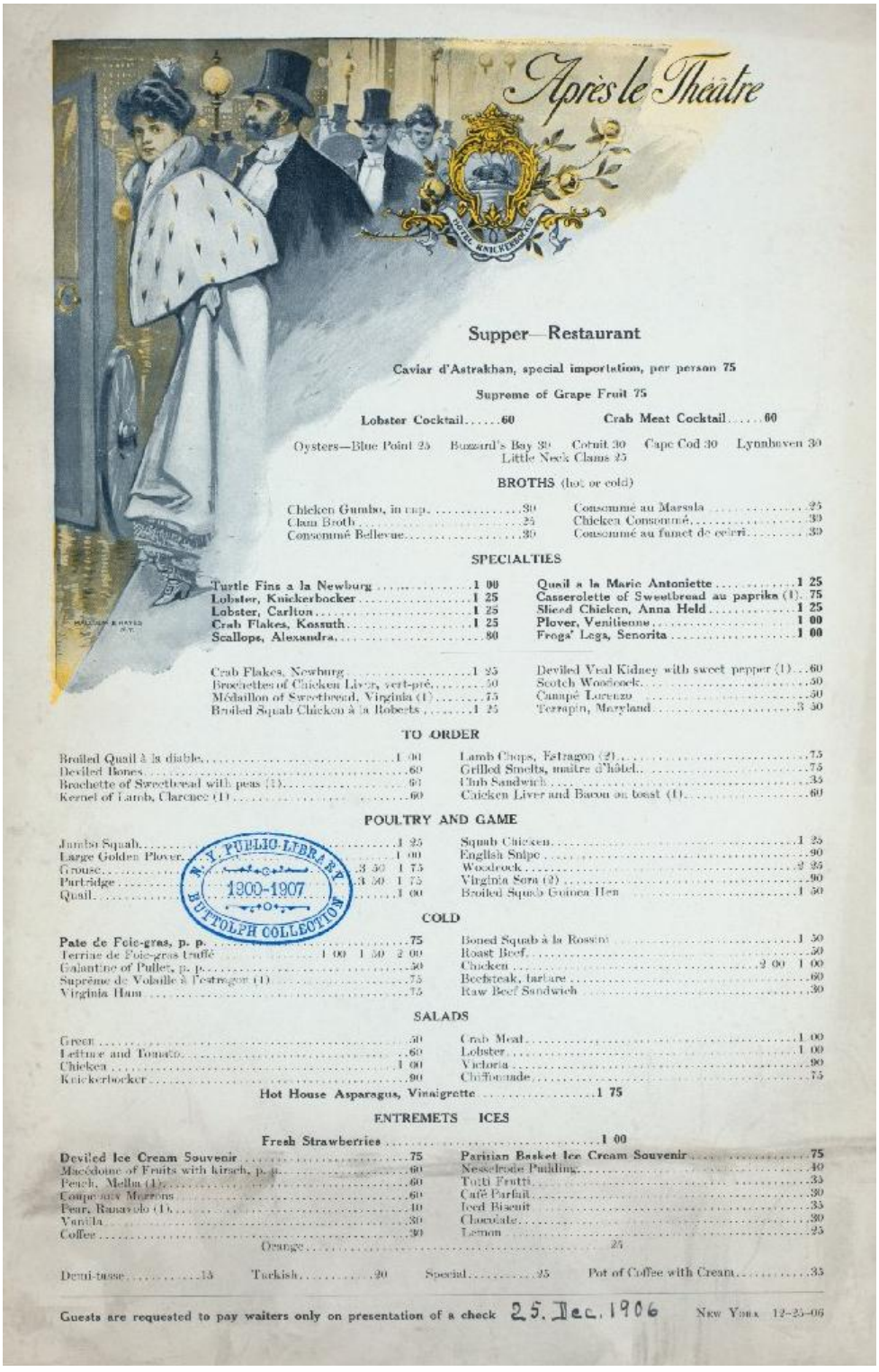
C. H. RICHTER & CO.,
5½ PINE STREET, N. Y.,
CATERERS,

September 5, 1887.

[Over.]

Figure 3 Bill of Fare for the Staton Island Athletic Club, such banquet menus typically feature a small selection of menu choices or pre-selected items for a full course meal (September 1887).

Figure 4 Bill of Fare for the Wanamaker Restaurant in Philadelphia, PA. This particular menu is printed on souvenir cloth rather than the traditional thin-paper of menus during the same period (November 25)



Après le Théâtre

HOTEL KNICKERBOCKER

Supper—Restaurant

Caviar d'Astrakhan, special importation, per person 75

Supreme of Grape Fruit 75

Lobster Cocktail.....60 Crab Meat Cocktail.....60

Oysters—Blue Point 25 Buzzard's Bay 30 Cotuit 30 Cape Cod 30 Lynnhaven 30
Little Neck Clams 25

BROTHS (hot or cold)

Chicken Gumbo, in cup.....30
Clam Broth.....25
Consommé Bellevue.....30
Consommé au Marsala.....25
Chicken Consommé.....30
Consommé au fumet de celeri.....30

SPECIALTIES

Turtle Fins a la Newburg.....1 00
Lobster, Knickerbocker.....1 25
Lobster, Carlton.....1 25
Crab Flakes, Kossuth.....1 25
Scallops, Alexandra.....80
Quail a la Marie Antoniette.....1 25
Casserolette of Sweetbread au paprika (1)..75
Sliced Chicken, Anna Held.....1 25
Plover, Venitienne.....1 00
Frogs' Legs, Senorita.....1 00

Crab Flakes, Newburg.....1 25
Brochettes of Chicken Liver, vert-pré.....50
Médaillon of Sweetbread, Virginia (1).....75
Broiled Squab Chicken à la Robeets.....1 25
Deviled Veal Kidney with sweet pepper (1)...60
Scotch Woodcock.....50
Canapé Lucenzo.....50
Terrapin, Maryland.....3 50

TO ORDER

Broiled Quail à la diable.....1 00
Deviled Bones.....60
Brochette of Sweetbread with peas (1).....60
Kernel of Lamb, Clarence (1).....60
Lamb Chops, Estragon (2).....75
Grilled Smelts, maitre d'hôtel.....75
Club Sandwich.....35
Chicken Liver and Bacon on toast (1).....60

POULTRY AND GAME

Jumbo Squab.....1 25
Large Golden Plover.....1 00
Grouse.....3 50 1 75
Partridge.....3 50 1 75
Quail.....1 00
Squab Chicken.....1 25
English Snipe.....90
Woodcock.....2 25
Virginia Sora (2).....90
Broiled Squab Guinea Hen.....1 50

COLD

Pate de Foie-gras, p. p......75
Terrine de Foie-gras truffé.....1 00 1 50 2 00
Galantine of Puller, p. p.....50
Suprême de Volaille à l'estragon (1).....75
Virginia Ham.....75
Boned Squab à la Rossini.....1 50
Roast Beef.....50
Chicken.....2 00 1 00
Beefsteak, tartare.....60
Raw Beef Sandwich.....30

SALADS

Green.....50
Lettuce and Tomato.....60
Chicken.....1 00
Knickerbocker.....90
Crab Meat.....1 00
Lobster.....1 00
Victoria.....90
Chiffonnade.....75

Hot House Asparagus, Vinaigrette.....1 75

ENTREMETS ICES

Fresh Strawberries.....1 00

Deviled Ice Cream Souvenir.....75
Macédoine of Fruits with kirsch, p. p.....60
Peach, Melba (1).....60
Compote aux Marrons.....60
Pear, Ramavolo (1).....10
Vanilla.....30
Coffee.....30
Parisian Basket Ice Cream Souvenir.....75
Nesselrode Pudding.....40
Tutti Frutti.....35
Café Parfait.....30
Iced Biscuit.....35
Chocolate.....30
Lemon.....25
Orange.....25

Demi-tasse.....15 Turkish.....20 Special.....25 Pot of Coffee with Cream.....35

Guests are requested to pay waiters only on presentation of a check 25 Dec. 1906 New York 12-25-06

Figure 5 Bill of Fare for the Hotel Knickerbocker Restaurant in New York. This menu is a great example of the notable artistic works featured on many of the historical menus found (December 1906).

Price Current Lists and Newspaper Articles

Digitized newspaper articles were obtained through TAMUG and TAMU library database subscriptions to *American Historical Newspapers*, *New York Times*, *Washington Post*, *American Periodicals* and *News Paper Archives*. Dr. Jones, the advisor on the project, possesses a collection of photocopied newspaper articles and price current lists retrieved from the AAS and NYPL. The archives were searched according to three criteria: date of publication, state of publication, price content, general species information species, and/or pertinent fishery information. Searches were restricted to New York, Pennsylvania, Virginia, New Jersey, Delaware and Maryland.

Newspapers providing much of the pertinent price information included: *The New York Times*, *Washington Post*, *Baltimore American*, *Baltimore Sun*, *The Patriot*, *The Daily News*¸ *Philadelphia Inquirer* and *Outlook*. Often, contemporary market details were expressed in the price current lists and newspaper articles (Figure 6). Information regarding the catch of the day, influx of fishery prices, and/or total tons of fish catches for the year was also found in these articles. Comments from fisherman, locals, or market officials gave an indication about daily fishery and market changes that would otherwise be impossible to validate. These excerpts, in conjunction with concurrent wholesale and retail prices, were used to explain plausible changes in fish stock abundance.

Pages 17—20 The New-York Times. Pages 17—20
NEW-YORK, SUNDAY, MARCH 12, 1893.—TWENTY PAGES.

HATS OFF TO THE TERRAPIN

AND TO THE EPICURE WHO DISCOVERED AND EXPLOITED IT.

ITS EDIBLE NATURE HAS COMPASSED ITS DESTRUCTION—WHERE IT IS FOUND AND ITS PRICES—HOW IT SHOULD BE COOKED—THE DIAMOND-BACKS DISAPPEARING.

The epicure is generally thought a selfish, self-gratifying person; as a matter of fact he is the reverse. His calling—not a high one, if you like—is to discover, through his acute sense of taste, the palatably-good things of earth. In doing this he helps to achieve the purpose of their creation and, through sharing his acquired knowledge with his fellow-men, he becomes their benefactor. One of his last and most famous discoveries is the terrapin, whose intrinsic edible goodness has compassed its own destruction, such goodness in it proving quite as fatal as in others is the gift of beauty.

The terrapin is found in perfection in Chesapeake Bay and on the table of the epicures of the country bordering those waters. Once it was limited to such tables, but rapid transit has put an end to all local delicacies. While it is in "season" terrapin is now a feature at every correct feast all over the United States, and that it might appear in all its glory whenever served from the kitchens of the local epicures—who are jealous of the reputation of the prize production of their bay—receipts for its cooking have been gladly distributed. That these receipts differ somewhat might be expected, yet their object is one—that of showing the terrapin at its best to the world.

The tribe terrapin of the genus tortoise has many varieties, the finest being the "diamond-back," found only in Chesapeake Bay. The virtues in flavor and delicacy of this variety are inherent, and make it quite as distinct as does its size, the ridge of diamonds on its back, and the color of its skin. Living beside it and feeding on the same things, and often taken with it in the same net, is another variety, the "slider," good in its way, but quite inferior to the "diamond-back."

life; beyond the offices is a tremendous kitchen, in which the terrapin is put through the first of culinary processes in a steam pan. This pan has a depth of 2 feet and a diameter of 4 or 5 but growing wider from its base. Over it fits a cover. Into this vessel a number of live terrapin are put, and then the steam is turned on. In half an hour it is turned off and the terrapins are examined to see if they are cooked sufficiently to separate the meat from the shell. This can be told by the cracking of the shell on the side, or by pressing a claw between the fingers and thumb, when, if they are done, the nails will come off. Skilled workers separate the eatable from the non-eatable, and with the juice or blood, which is carefully saved, the meat is put into tin cans and in that way shipped away as registered Chesapeake terrapin. It is in nowise canned meat, the terrapin being cooked only to supply immediate orders.

In their dormant condition, terrapin can be shipped any distance in barrels packed in loose seaweed or grass. They require no feeding from the time they are taken from the water, and can pull through or survive with the least and worst ventilation during transportation without injuring the flavor or delicacy of their meat. It is to save the expensive rates of shipment in bulk that the shipping of the partially-cooked terrapin has been resorted to.

Suppose, however, in the private kitchen you prefer the live terrapin. If it is to appear on the luncheon table or at dinner or even at midnight supper you begin the cooking of it in the morning. If you can steam it it is much better than boiling, but the latter will have to be resorted to if the first is impracticable. Steaming is considered the best. The terrapin must be plunged into boiling water and the water must be kept boiling until the terrapin is done. That is ascertained in the way already mentioned.

Hold the terrapin over a large, clean, deep vessel and open the shells as you would a book. As you do this the blood or juice will flow into the vessel provided beneath it. Put this liquid away until the end of all of the processes of cooking; it is only added a few minutes before the dish is served.

To return to the terrapin. Put it on a flat dish, cut off the head, cut out the gall, the liver, and a part of the entrails, and throw them away. They are not good; neither is the skin, from which the meat must be carefully picked. Leave in all of the small bones. They are stamps of the genuiness of the terrapin, as veal and other substances are added to inflate the dish.

For a terrapin stew: Put into the inner vessel of a *bain marie* less than a quart, but more than a pint, of milk—supposing you are providing for twelve covers—and thicken with a spoonful of flour rubbed smooth into one spoonful and a half of butter. After this sauce is boiled, add all of the meat of the terrapin and cook steadily, but not fast, one hour and a half. Fifteen minutes before serving add the blood. Two or three minutes before serving, add a tiny glass of sherry, pepper and salt. In the hot dish in which the terrapin is to be served have chopped up fine two hard-boiled eggs. Pour in the stew and serve immediately.

Figure 6 Newspaper article from the New York Times which includes notable historical context about Diamondback terrapin. This article is great to show the importance of contemporary newspaper articles in determining consumer market demand of the different species.

American Antiquarian Society

Funds provided by Texas Sea Grant financed a trip to the AAS in Worcester, Massachusetts in January 2013. The four days allowed were spent compiling photographic evidence of post – 1830 price current lists, relevant books, and graphics and extracting newspaper articles from the Readex historical digital collections, only available onsite at AAS.

Inflation adjusted prices

All menu and market prices were converted to 2011$ using the *Sahr CPI* adjustment inflation factor and plotted to demonstrate the trend for the consumption of each item and relationship to the CPI. Data was recorded according to species, year, original price, and CPI price. Although the CPI originated in 1913, economic historians have reconstructed a price index that extends to the 1660s (McCusker 2001). To achieve this, historians examined historical records of wages, property costs and stable priced consumer goods and compared them with prices of similar items of present day (McCusker 2001). The *Sahr CPI* accounts for periods of economic decline and growth, namely economic recession and time of war, and so eliminates possible bias in $/unit conversions during such periods.

NMFS Commercial Landings Data

Interactive data summary programs available through the *NMFS Commercial Fishery Statistics* allow one to search the commercial fishery data bases and summarize United States domestic commercial landings in several formats (NMFS 2013). One can obtain the total commercial landings (lbs) and dollar value for each species in each of the 50 states for the period 1950 to

present day (NMFS). Each of the target species reported in the NMFS dataset were converted to as price per pound ($/lb) and further converted to 2011$ price/lb using *Sahr* 2012 (Figure 7).

Price Standardization

Through time, seafood markets often sold goods in a number of different packaging units such as per pair, each, per pound, per barrel or half barrel. The prices were often variable between packaging units and thus required adjustments to a standardized packaging unit.

For direct comparison with NMFS reported prices, historical retail market and menu prices were standardized to a price per pound ($/lb) unit. Once $/lb values were calculated, prices were inflation adjusted to 2011$ prices using the appropriate *Sahr CPI* inflation adjustment factor. Both NMFS price data and adjusted historical prices were plotted for visual comparison between NMFS price data and historical price data.

Equivalent Wholesale $/lb

Calculating the equivalent wholesale $/lb for years before 1950 was obtained by using the overlap between retail prices from historical sources and NMFS wholesale prices. In order to extend the NMFS $/lb dataset, annual averages were first calculated using the historical prices of years for which prices were found. It was appropriate to calculate an annual average to compare retail prices to the reported annual average of wholesale NMFS prices. For years of overlap (1950 – 1981), historical annual average prices were converted to a $/lb equivalent to hind-casted NMFS wholesale price by dividing the NMFS annual average price by the concurrent historical annual average price to calculate an adjustment factor. Adjustment factors for years

1950 – 1981 were averaged to establish a constant adjustment between wholesale and retail prices. The wholesale/retail adjustment factor eliminates the price mark-up for such reasons as labor, processing, and/or shipping and aligns dock-landed prices for seafood items to the consumer retailer prices.

Diamondback terrapin

In the consumer marketplace, Diamondback terrapin were most often sold by the dozen or per turtle. Prices were variable between the male and female terrapin and different sizes sold, the larger females being more preferred over the smaller males. Terrapin prices were first converted to $/dozen, then converted to a $/lb of terrapin, to be consistent with NMFS data. An average weight between male and female terrapins is 1lb; this average was used to determine the $/lb of terrapin (Diamondback 2013). $/dozen was divided by twelve, assuming a single terrapin weighs 1lb, to account for the difference between male and females, twelve terrapins would weigh 12lbs. The calculated $/lb was converted to 2011$ using *Sahr CPI* inflation adjustment factor for corresponding years. All individual prices for a calendar year were averaged to obtain an annual price.

NMFS commercial catch data does exist for Diamondback terrapin; however the catch is minimal. Present NMFS catch data does not accurately represent the historical price significance of terrapin because it fell out of the market and from menus as a popular food item well before 1950. Pre-1950 prices of terrapin were not standardized to the NMFS post-1950 prices because it would be ill-representative of the historical menu and market prices. Historical market prices of

terrapin converted to 2011$ prices were plotted with the NMFS 2011$ prices to compare the drastic price difference (Figure 8).

Canvasback duck

For the consumer market Canvasback ducks were often sold by the pair, and as such prices were standardized to $/pair. $/pair prices were inflation adjusted to 2011$ using the *Sahr CPI* inflation adjustment factor for corresponding years. No NMFS data exists for Canvasback ducks; therefore, only the historical inflation adjusted prices were plotted to illustrate the market activity of this once highly-favored food commodity.

American shad

Historical retail prices of American shad featured transitions of packaging units throughout the period of interest (1850-1950). Between 1850 - 1860, shad were largely sold in wholesale units of $/barrel or $/100. In some cases retail $/each prices were reported during this period; excluding the wholesale unit prices, retail prices were only considered for this study since a consistent relationship between wholesale and retail prices for these earlier years could not be found. Between 1860 - 1913, retail $/each prices appeared to be the standard unit of sale to consumers. $/each prices were converted to $/lb prices by dividing the $/each price by 4, the average weight of an American shad (Anonymous 1955). The first $/lb prices were collected from articles published in 1914. Between 1914 - 1922, consumer markets reported shad sold as either $/each or $/lb. Any $/each prices were also divided by a lb weight average for a $/lb price. From 1922 to 1983, the last year of collected prices, markets and grocery store reported $/lb prices. Between 1913 – 1922, markets reported the sale of Susquehanna shad of the Susquehanna

River, a historically significant shad fishing river in the upper Chesapeake Bay. Prices of Susquehanna shad during this period were on average higher than shad caught from other regions of harvest and so were excluded from this study.

For years after 1897, markets began reporting consistent prices for both roe and buck shad; roe referring to the larger egg-bearing females and bucks referring to the smaller males (SCDONR 2011). Designated prices for both roe and buck shad were noted and plotted to demonstrate the often higher price of the roe shad to the buck shad (Figure 9). Annual averages of retail market prices overlapping with NMFS wholesale prices were found for years between 1950 – 1981. An adjustment factor of (0.46) was calculated; individual and annual averages of market prices were multiplied by this adjustment factor to convert retail prices to equivalent NMFS wholesale $/lb prices (Figure 10)

Striped bass

Early wholesale prices and retail prices of striped bass were largely reported as $/lb prices until the 1970s when grocery advertisements began reported fillets rather than wholefish $/lb prices. Prior to the 1890s striped bass were referred to as rockfish in the Chesapeake region as can be seen in many of the contemporary newspaper articles and market reports found during this study (Figure 15). $/lb prices were converted to 2011$ using the *Sahr CPI* inflation adjustment factor. Annual averages of retail market prices overlapping with NMFS wholesale prices were found for years between 1950 – 1981. An adjustment factor of (0.49) was calculated; individual and annual averages of market prices were multiplied by this adjustment factor to convert retail prices to equivalent NMFS wholesale $/lb prices (Figure 11)

Bluefish

Bluefish were most often reported to seafood markets as $/lb prices for whole bluefish. It was not until the late 1980s that bluefish fillets began to be reported at higher prices than would be for a whole bluefish of the same date. To adjust fillet $/lb prices to whole-fish $/lb prices, years in which both fillet prices and whole-fish price were found were considered for this study. For each given year the average of whole-fish prices was divided by the average of filet prices to calculate a unit conversion factor. Fillet prices were multiplied by this factor to attain equivalent whole-fish $/lb prices. Whole-fish $/lb prices were converted to 2011$ using the *Sahr CPI* inflation adjustment factor. Annual averages of retail market prices overlapping with NMFS wholesale prices were found for years 1950 – 1996. An adjustment factor between wholesale and retail prices (0.24) was calculated. Constant and annual average market prices were multiplied by this adjustment factor to convert retail prices to equivalent NMFS wholesale $/lb prices (Figure 12)

Blue crab

In order to meet the demand of many different means of preparation, Blue crabs were sold in various quantities and packaging units and sold as hard shell or soft shell. Crab was sold as: dozen (hard/soft shell), pound of lump meat, quart, can of claw meat, and can of lump meat. Soft shell crabs were usually eaten whole. It can therefore be assumed that hard shell crabs were used for lump crab and claw meat processed for canning or packaging. All crab prices were converted to $/lb to comply with NMFS $/lb values (Figure 13). The average weight of a male and female hard shell crab is 1.5lbs (Blue crab 2013). Hard shell and soft shell crabs sold by the dozen were divided by eighteen to account for number of crabs and estimated weight; thus, giving a $/lb

value. A single blue crab yields on average 2oz of meat (Blue crab n.d.). Lump crab meat did not require a meat yield conversion because it was already sold as $/lb. There are 32oz of meat in a quart, by this estimate sixteen crabs will be used to produce one quart of crab meat, therefore the prices were divided by 24. Canned crab was sold as 12oz or 16oz cans; the same conversions to $/lb of crab meat were used. Can prices for 16oz of were divided by twelve. Canned meat varied between lump crab meat and claw meat. The claw meat sold by the can was standardized to lump crab meat sold in a can in order to satisfy any difference in yield.

Once meat was converted to $/lb, all prices were standardized to a hard shell crab price. Soft shell crab required a conversion factor of 0.18; crab meat sold by the pound had a conversion factor of (0.06); crab meat sold in a quart had a conversion factor of (0.67); canned lump crab meat had a conversion factor of (0.11); and canned claw meat had a conversion factor of (0.16). All prices were plotted to illustrate relationships between units sold. All prices within a given calendar year were averaged to give an annual price and plotted with NFMS catch data.

NMFS reports it annual catch as $/lb of live crab. Several landing reports exist for blue crab depending on the molting phase of the crab: hard shell, soft shell, and peeler. The only values used from the NMFS dataset for conversion were hard shell and the combined landing of soft shell and peelers. When peelers are collected from the Bay they are held in a collection tank until their molting phase is completed and then sold as soft shell crab (Lippson 1973). $/lb prices of soft shells and peelers were standardized to hard shell prices using a conversion factor of (0.18). This historical price data was plotted with NMFS dataset in order to standardize the historical values. Though all prices were standardized to hard shell prices, there remains enough variability

to require further conversion. Hard shell, meat sold per quart and canned lump crab meat had a conversion factor of 0.50; soft shell had a conversion factor of 0.60; crab meat sold per pound had a conversion factor of 0.55; canned claw meat had a conversion factor of 0.23. Most of the conversion factors were similar with the exception of the canned claw meat. This is likely because of the extra time needed to extract claw meat and greater number of crabs needed to obtain 12oz or 16oz of claw meat.

Oyster

As noted in contemporary literature and stated by NOAA fisheries biologist Michael Lewis (2013), wholesale and retail oyster prices differ according to size of the oyster, quantity sold, and labor required after initial collection. Thus, these prices had to be standardized after being inflation adjusted to 2011$. Oysters were sold in units of: 100, 1000, dozen, basket, bushel, barrel, gallon, pint, and quart. Oysters sold as 100, 1000, or dozen were divided by the quantity sold (i.e. 100, 1000, 12, respectively) to find the price per oyster. The gallon, pint, and quart prices were converted to price per oyster ($/oyster) using a figure found in an 1885 *Philadelphia Inquirer* article which stated a gallon of oysters contained 200-400 oysters depending on size; because most of the prices reported were not accompanied with an oyster size, an average of 300 was used in the conversions (Anonymous 1885). The price for a gallon of oysters was divided by 300 to obtain the nominal price of each oyster. It was assumed the labor and cost of packaging for the different quantities was relatively the same. Prices per pint were divided by 38, since a gallon is equivalent to eight pints. The same assumption was made for quart; quart prices were divided by 75 because four quarts is equivalent to one gallon. No value for the number of oysters present in a barrel, bushel, or basket was found; therefore, these values had to be

standardized to 100 count $/oysters. This was done by graphing the $/oyster for 100 count with the actual barrel, bushel, and basket (collectively referred to as bulk) value. Years that had values for both 100 count and bulk prices were then compared to find a conversion factor between the values. An average conversion factor of (.002) produced the best-fit graph and was used for all years of the bulk prices to adjust the prices to those of the 100 count $/oyster. Once quantities were converted to price per oyster, they were converted to 2011$ prices using *Sahr CPI* inflation adjustment factors. The annual average of prices was found to eliminate bias of anonymously high and low prices, as well as, report the catch similar to the NMFS dataset.

These inflation adjusted retail market $/oyster values were then standardized to menu prices because oysters were almost always sold per dozen or half dozen on menus. Menu prices were adjusted to $/oyster according to the value stated on the menu or by price comparison within consecutive years for those that did not contain a specified quantity. Menu prices were inflation adjusted to 2011$ using *Sahr CPI* inflation adjustment factors, then compared with the retail market prices. The retail market data was then standardized to menu price data.

NMFS reports prices of oyster per pound of oyster meat, without the shell (Figure 14). During an email conversation, NOAA fisheries biologist Michael Lewis (2013) stated the standard conversion factor to convert oyster meats to live weight is (15.08) for landings along the Atlantic coast. This value was used to convert NMFS reported oyster $/lb to $/oyster.

Price data from NMFS, menus, and market data were plotted to compare all prices to the NMFS dataset. The only market data included were gallon, pint, and quart values since an oyster count

for the container was known and these quantities were sold as meat. The bulk values were sold as live oysters; therefore, no processing costs were involved and the weight of the shell was a concern. Market data was standardized to the menu prices by a conversion factor of (0.157), which was calculated by comparing the menu data prices with the market data prices. All prices within a given calendar year were averaged to obtain the average price per year. These annual averages were then graphed with the NMFS data for standardization. The conversion factor for historical data to NMFS data was (4.66).

NMFS dates for years between 2007 - 2010 were excluded from the graph because they were anonymously high and are not representative of the numbers reported by the catch data. NOAA indicates that some catch/price data in their online database may be in error. It is believed that is the case for the oyster per lb 2007- 2010 data and further discussion with NOAA is warranted and ongoing.

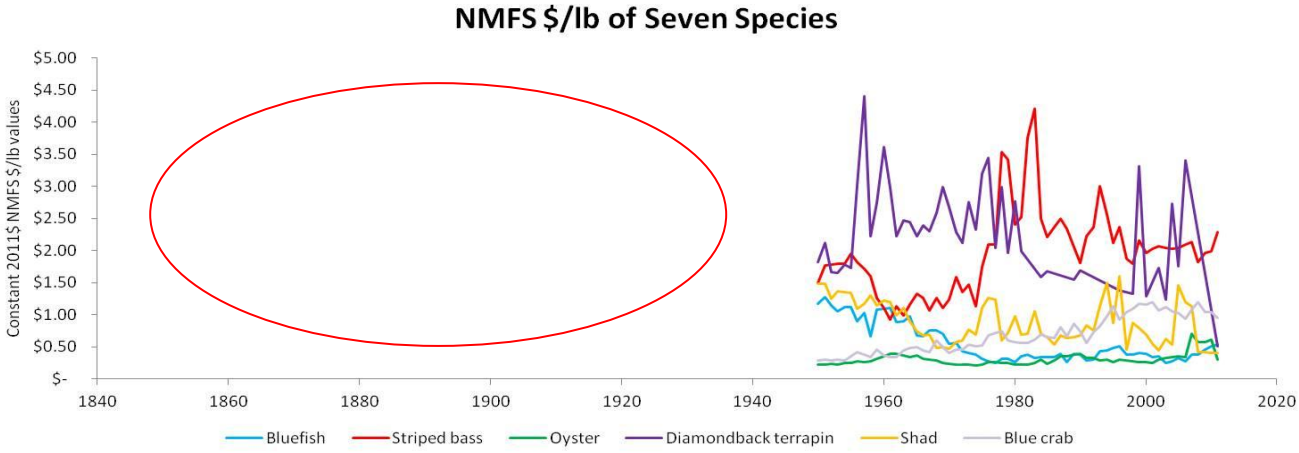


Figure7 - the existing NMFS post-1950 data and the non-existent fisheries data for years prior to 1950.

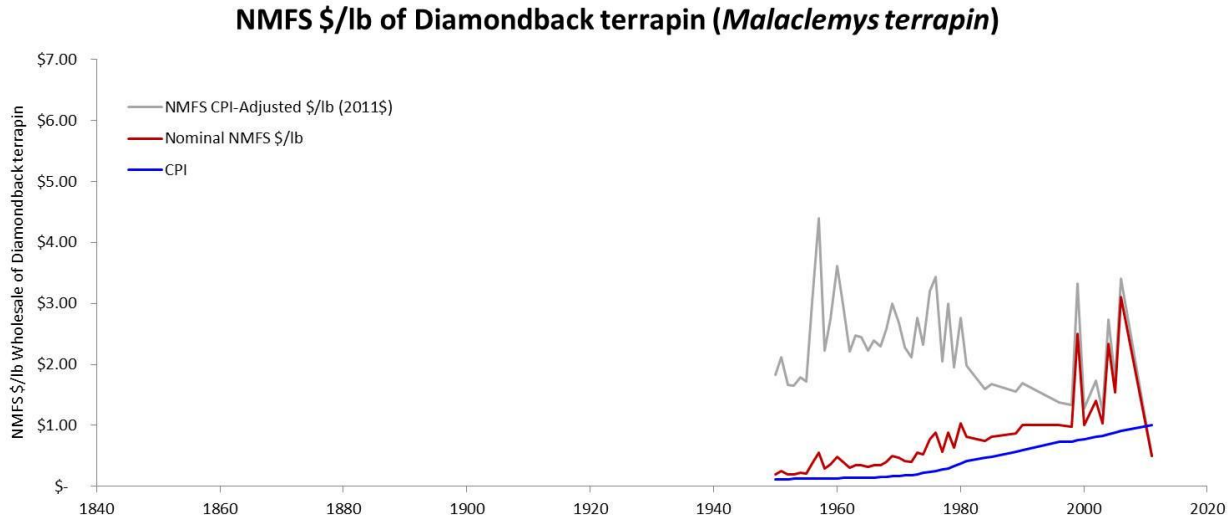


Figure 8– NMFS 2011$ Sahr CPI inflation adjusted prices for Diamondback terrapin, nominal NMFS $/lb prices for Diamondback terrapin, and Sahr CPI inflation adjusted price for US$1.00 2011$ equivalency. These three were plotted to illustrate the importance of inflation adjusting the NMFS price data for the species.

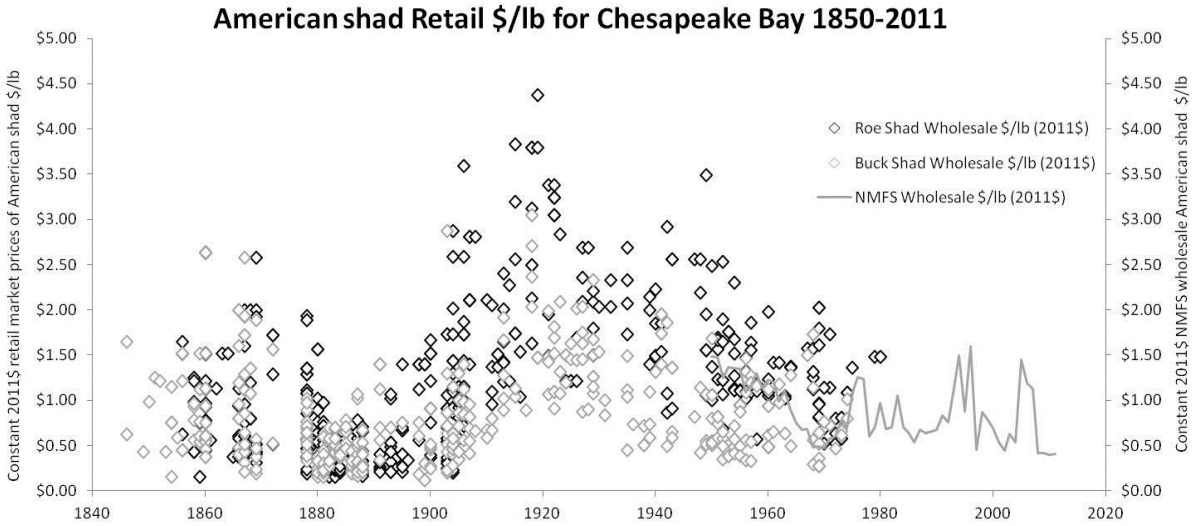


Figure 9 –Sahr CPI inflation adjusted retail market prices of $/lb for American shad of Chesapeake Bay from 1850 – 1980. Retail market prices are plotted with the NMFS American shad wholesale $/lb in 2011$ price equivalency from 1950 – 2011. Retail market prices for $/lb were converted to represent hind-casted NMFS wholesale prices for 1850 – 1950.

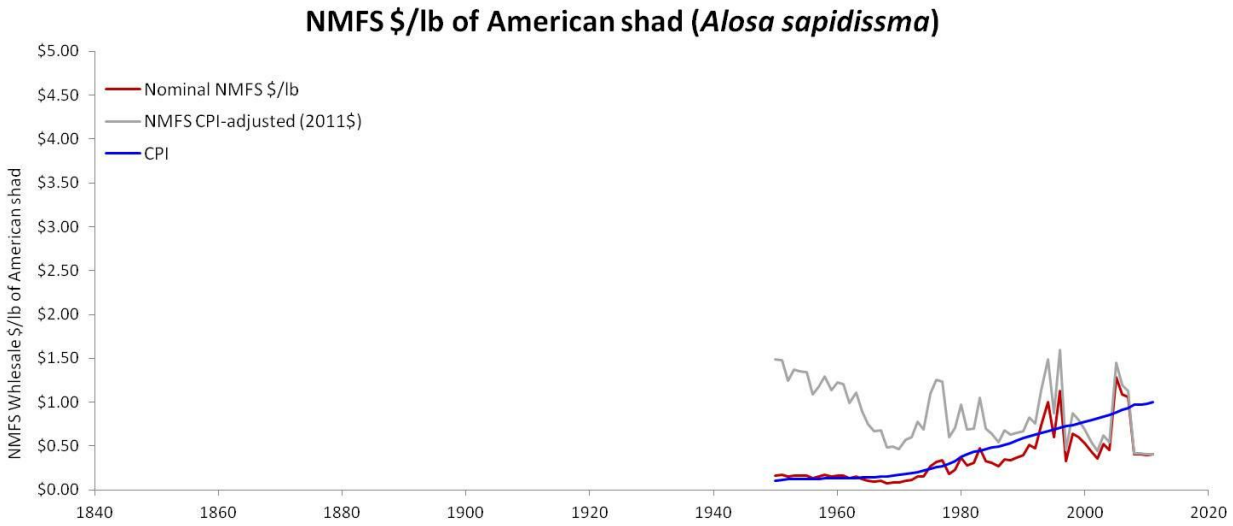


Figure 10 – NMFS 2011$ Sahr CPI inflation adjusted prices for American shad, nominal NMFS $/lb prices for American shad, and Sahr CPI inflation adjusted price for US$1.00 2011$ equivalency. These three were plotted to illustrate the importance of inflation adjusting the NMFS price data for the species.

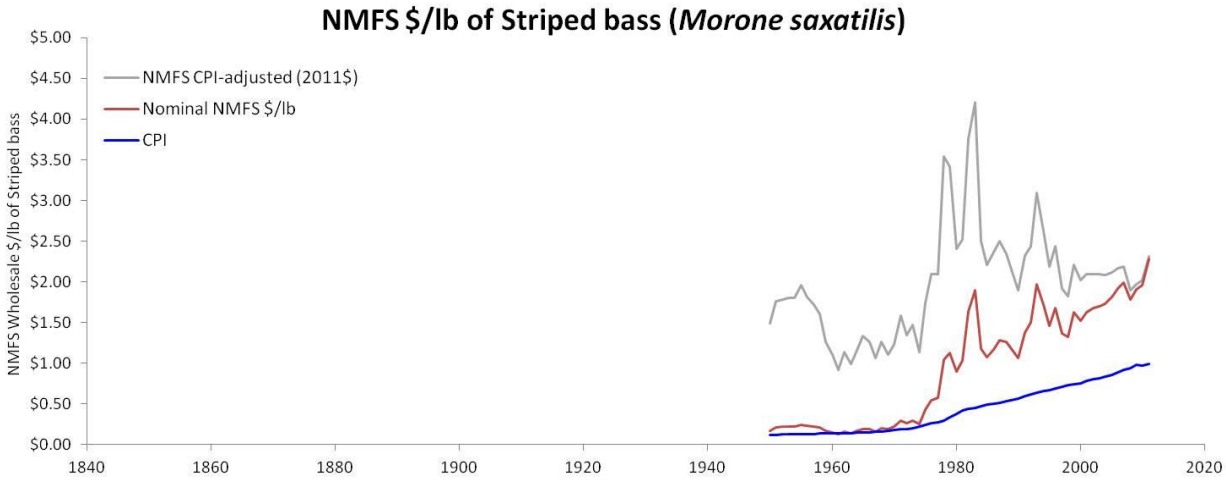


Figure 11 – NMFS 2011$ Sahr CPI inflation adjusted prices for Striped bass, nominal NMFS $/lb prices for Striped bass, and Sahr CPI inflation adjusted price for US$1.00 2011$ equivalency. These three were plotted to illustrate the importance of inflation adjusting the NMFS price data for the species.

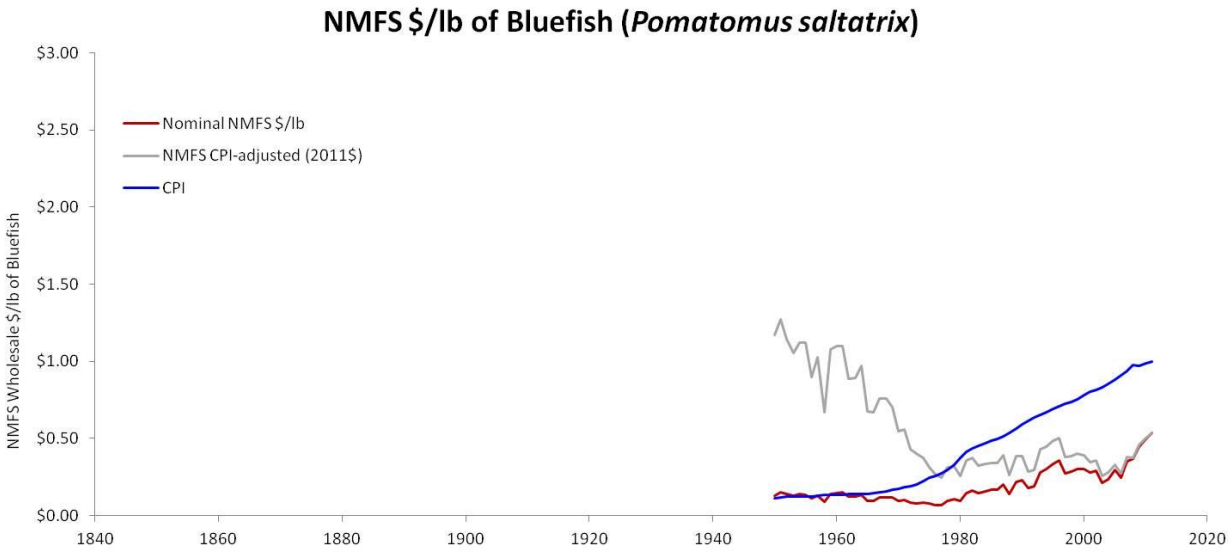


Figure 12 – NMFS 2011$ Sahr CPI inflation adjusted prices for Bluefish, nominal NMFS $/lb prices for Bluefish, and Sahr CPI inflation adjusted price for US$1.00 2011$ equivalency. These three were plotted to illustrate the importance of inflation adjusting the NMFS price data for the species.

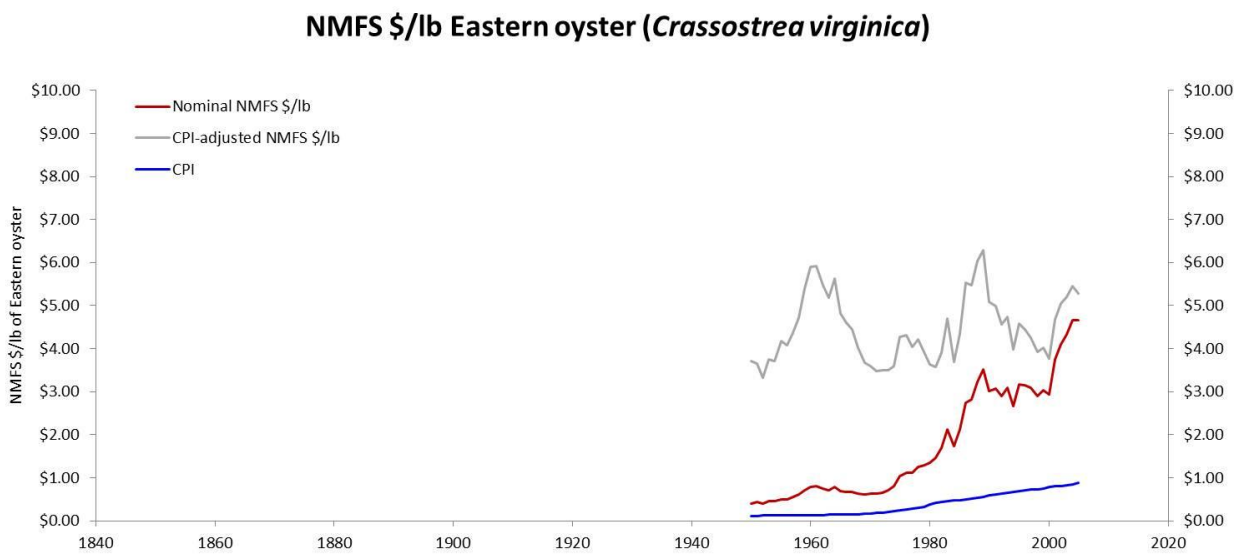


Figure 13 – NMFS 2011$ Sahr CPI inflation adjusted prices for Eastern oyster, nominal NMFS $/lb prices for Eastern oyster, and Sahr CPI inflation adjusted price for US$1.00 2011$ equivalency. These three were plotted to illustrate the importance of inflation adjusting the NMFS price data for the species.

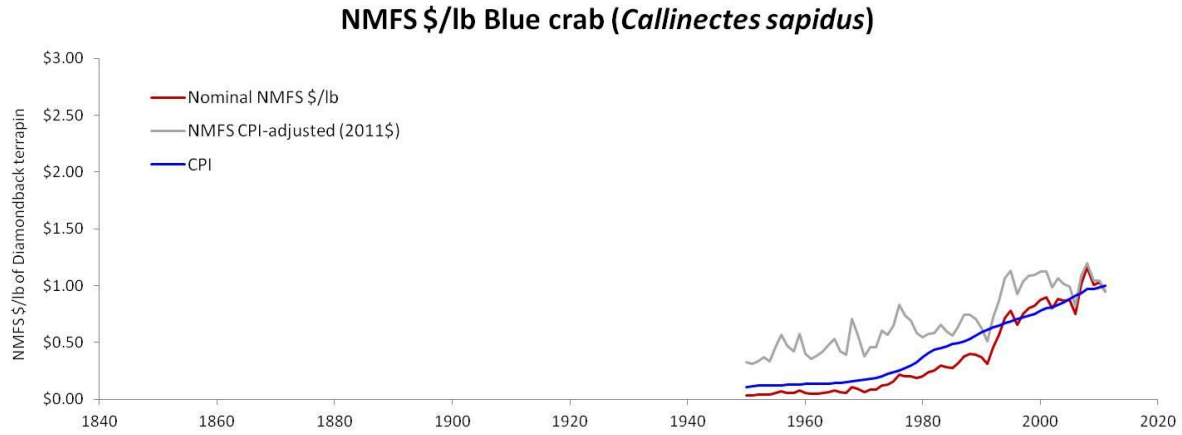


Figure 14 – NMFS 2011$ Sahr CPI inflation adjusted prices for Blue crab, nominal NMFS $/lb prices for Blue crab, and Sahr CPI inflation adjusted price for US$1.00 2011$ equivalency. These three were plotted to illustrate the importance of inflation adjusting the NMFS price data for the species.

CHAPTER III

RESULTS

Diamondback terrapin

The first price was obtained from the *Baltimore Sun* in 1853 where Diamondback terrapin were sold for $9 (US$257.14 in 2011$) per dozen (Anonymous 1853). Prices reached the greatest value in 1898 selling for $100 (US$26312 in 2011$) per dozen (Anonymous 1898). The greatest average $/lb, occurred in 1894 when terrapin sold for $7.18 per pound ($US184.94 in $2011) (Anonymous 1894).

Prices for terrapin continued to gradually increase until the highest value in 1894. Following this increase was a gradual decrease in price until the final price found in 1926. The only price obtained after 1919 was the price in 1926 extracted from *Hagerstown Daily Mail* whereby efforts to bring terrapin back to markets began (Anonymous 1926). Market behavior increased exponentially over a 20-year span from 1880 to 1900 reflecting the rapid growth in demand for terrapin. A sharp decline occurred in market prices much sooner than in menus after 1897 (Figures 15 & 16).

Menu prices for Diamondback terrapin followed a similar trend to that of the wholesale and retail market values (Figures 17a & 17b). The first price found for terrapin was in 1850 from *United States Senate Restaurant* at $0.75 (US$21.42 in 2011$) for an entrée. A slight decrease in price occurred for the years from 1850 – 1879, just before the abrupt increase that began in 1880. By 1903, an entrée sold for $2.50 (US$62.50 in 2011$) to $3.50 (US$87.50 in 2011$) at *St. Martin's Café* in New York. Another increase in price took place in 1936 where terrapin sold

for $3.00 (US$47.62 in 2011$) at *The Shoreham* restaurant. This increase was followed by another decrease in 1952 whereby a terrapin entrée sold for $2.75 (US$22.92 in 2011$) at *Millers Brother's Restaurant* in Maryland. A final high price occurred in 1971 at *Haussner's* in Maryland where a terrapin entrée sold for $6.95 (US$35.10 in 2011$). The last price found was in 1974 from *Haussner's* in which terrapin sold for $7.95 (US$33.40 in 2011$).

Canvasback duck

The first price found for this study was in 1854 from the *New York Times* with Canvasback duck selling for $1.00 - $1.25 (US$26.32 - US$32.89 in 2011$) per pair (Anonymous 1854). At its highest value in 1891, the ducks were selling for $6.50 - $7.00 (US$158.54 - $US170.73 in 2011$) per pair (Anonymous 1891). In less than forty years, the market price of Canvasback duck experienced a six fold increase in price (Figure 18).

Consumer market prices for Canvasback duck were limited post-1870. Prices 1850-1870 illustrated two sizeable price increases followed by a swift decrease in price. The data plotted post-1870 is minimal and does not accurately represent the trend of prices. It is likely the market prices follow the same trend as the menu prices.

The first menu price found for this study was from an 1857 *Ballard Hotel Saloon* menu which sold Canvasback duck for $1.25 - $2.50 (US$32.05 – 64.10 in 2011$) per pair. The prices continued to increase until the highest value in 1903 at $5.00/dish (US$125.00 in 2011$) from the *Louis Sherry Restaurant.* It was not until 1910 – 1913 did a decrease in prices occur. No menu prices were found after 1913 likely due to the passage of the Migratory Bird Treaty Act of 1918 (Figure 19a & 19b).

Shad

The earliest reports of prices found during this study appeared in 1846 in the *Baltimore Sun* at an average of $0.09/lb ($2.41 2011$ US). By 1915-1918, the price for shad reached its highest level of the twentieth century. By the 1920s, contemporary articles reported a scarcity of shad and inability to meet market demand at a time when the price of shad began to show a steady decline which continued well into the 1950s with the introduction of NMFS commercial catch data. Increase in menu price and simultaneous reduction in menu appearance occurred as market retail and wholesale prices along with landings continued to decrease (Figures 9 & 20). Due to a demand that could not be met, the shad as a menu staple likely fell out of favor as new fish surfaced in markets.

On the menu, shad was typically sold broiled with or without roe or smoked over an open flame on a wood plank. The first menu price was found in 1857 on a *Ballard Hotel Saloon* menu and advertised simply as 'shad'. Planked shad menu prices were often two to three times more expensive then broiled shad, therefore prices for planked shad were excluded from this study due to a scarcity in planked shad prices before 1897 and after 1940. Menu prices for shad have shown a steady increase faster than the inflation rate from the first price in 1857 reported in this study to the most current price found in 1998 (Figures 21a & 21b).

Striped Bass

Wholesale and Retail Market Prices

The earliest reports of prices found for this study appeared in 1854 in *The New York Times* at $0.12/lb ($3.42 2011$ US). The latest price was found in 1981 at $1.79 (US $3.89 in 2011$) in a

grocery store ad published in the *Washington Post*. The greatest number of overlapping price during the period between 1950 – 1981 were from grocery store ads published in the *Washington Post*. Prices found (n=880) illustrate 30-40 year cycles of price increase and decline. Low annual average prices in the depressions of these cycle occurred in 1864 ($3.26 (2011$ US)), 1899 ($2.37 (2011$ US)), 1935 ($2.32 (2011$ US), and 1961 (2.05 (2011$ US) before the closure of the fishery in 1985 (Figures 17 & 18). The abundance of prices during the period of overlap closely complements the NMFS wholesale prices (Figures 22 & 23).

Striped bass menu items do not exhibit price movements similar to that of market retail prices (Figure 24a & 24b). Around the 1900s, as market prices reach a low point in a 40-year cycle, menu price reach a peak level in prices before 1940s. By the 1960s and into the 1980s, when harvest increased to such levels that would lead to the fishery's closure, menu prices concurrently also rise with the rise in market and NMFS prices.

Bluefish

Though featured on popular menus of restaurants in higher price brackets, bluefish have seldom been considered a delicacy food item. In addition to being a popular game fish throughout much of the twentieth century, bluefish was also a frequent presence in markets and grocery stores as well as restaurant menus. The earliest price found for this fish was in 1854 reported by the *New York Times* $0.06/lb (US$ $1.58/lb in 2011$). Prices revealed steady increase until a peak price of $0.30/lb (US$ $6.67/lb in 2011$). Shortly after this peak prices began to decline sharply to an annual average of $0.31/lb (US$ $1.29/lb in 2011$). Price then began to show an increase until a peaked annual average price was reached in 1947 at $0.45/lb (US$ $4.46/lb in 2011$) a short

time before the introduction of the NMFS catch data. Retail prices rose faster than the inflation rate and thus remain higher than wholesale prices reported by NFMS (Figures 25 & 26). Unlike market prices, menu prices continually increased from 1850 – 2011 (Figure 27a & 27b).

Blue crab

Retail market prices appeared to follow the inflation rate for most of the early nineteenth century until 1900. In 1900, prices began a trend that rose faster than the inflation rate for twenty years. Prices fell faster than inflation rate from 1920 – 1940. After 1940, retail market prices rose faster than the inflation rate. Prices rose faster than the inflation rate post-1950 and the establishment of NMFS commercial catch data (Figure 28). Blue crab fishery has been sustainable historically, and continues to sustain a healthy commercial harvest (NMFS 2013). Blue crab menu prices had a rapid increase in price in 1900, which was followed by rapid decrease in price. A steady increase in prices occurred at 1940, which did not experience another decrease in price (Figure 29a & 29b).

Oysters

The earliest price found for this study was featured in an 1850 *Littel's Living Age:* The Oyster Trade where a bushel cost an average $0.18 (US$5.71 in 2011$) (Anonymous 1850). According to *The Merchant's Magazine and Commercial Review,* by 1858 a bushel of oysters had almost doubled to $0.35 (US$9.46 in 2011$) and some 1,510,000 bushels were harvested from Chesapeake Bay to be sold for raw consumption or sealed and shipped to domestic and foreign markets (Anonymous 1858). Prices continually increased from 1857 – 1866, where first low price was seen in 1876. The next price increase occurs some twenty years later in 1886. The

following decrease in price occurs in 1918. Following this, wholesale and retail prices, along with menu prices, continued to increase until 1929; before a minimal decrease in prices in 1936. The fluctuation between price increase and decrease illustrates a very clear twenty year cycle in prices, and presumably harvests (Figure 30). Menu prices for oysters followed a similar trend to the oyster market prices because they were included in the market price graphs. Prices showed a steady increase until 1900 when the prices experienced a rapid increase. After 1900, prices fell and followed inflation rate until a continued increase after the establishment of the 1950 NMFS dataset (Figure 31a & 31b).

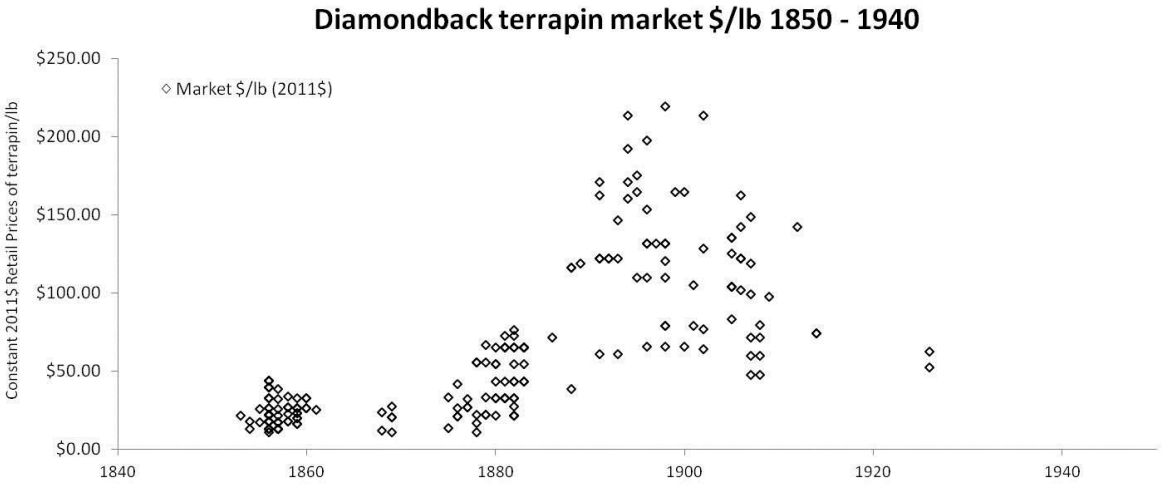


Figure 15 –Sahr CPI inflation adjusted retail market prices of $/lb for Diamondback terrapin of Chesapeake Bay from 1850 – 2011. No significant NMFS data exists for Diamondback terrapin post-1950.

Figure 16–Annual averages of Sahr CPI inflation adjusted retail market prices of $/lb for Diamondback terrapin of Chesapeake Bay from 1850 – 2011. No significant NMFS data exists for Diamondback terrapin post-1950.

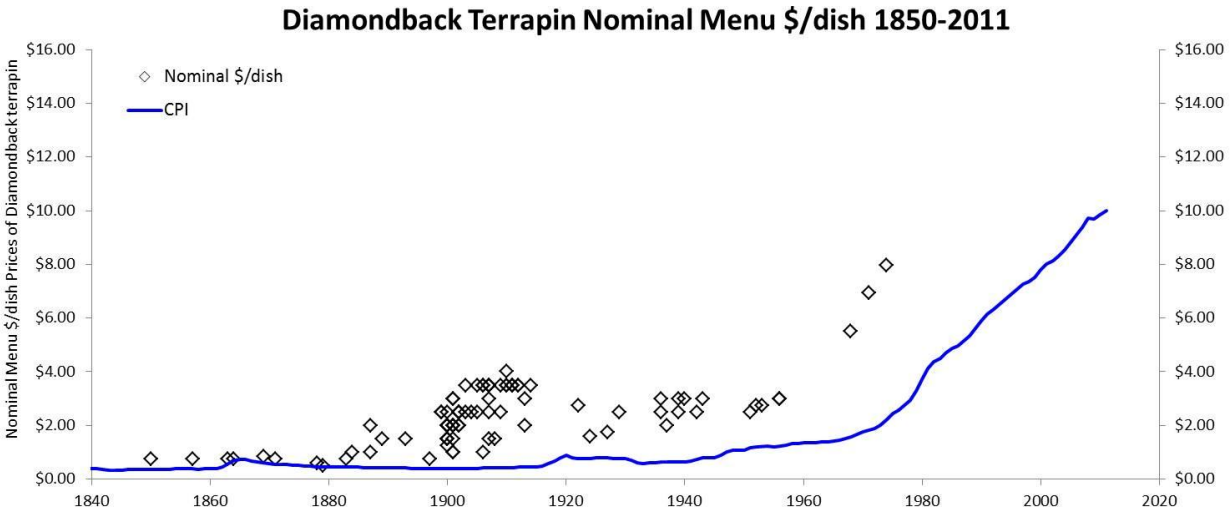


Figure 17a–Nominal menu $/dish of Diamondback terrapin entrees for 1850 – 2011 plotted with the Sahr CPI inflation adjusted 2011$ $1.00 equivalent to show that non-adjustment of prices is ill-representative of the price trend.

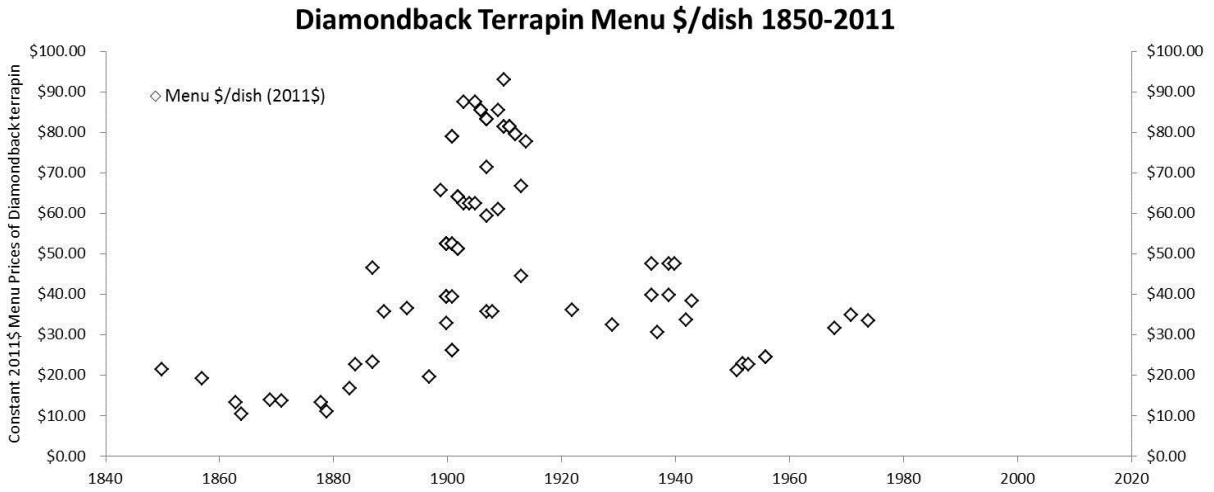


Figure 17b–Sahr CPI inflation adjusted 2011$ real prices of menu $/dish Diamondback terrapin entrees for 1850 – 2011.

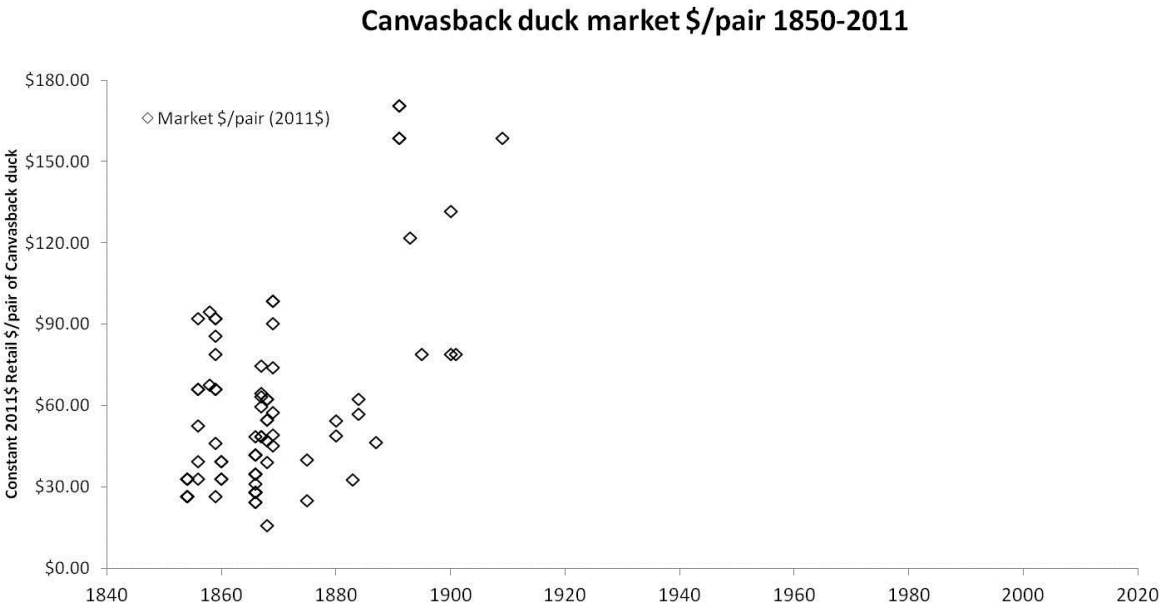


Figure 18 –Sahr CPI inflation adjusted retail market prices of $/pair for Canvasback duck of Chesapeake Bay from 1850 – 2011. No NMFS data exists for Canvasback duck post-1950.

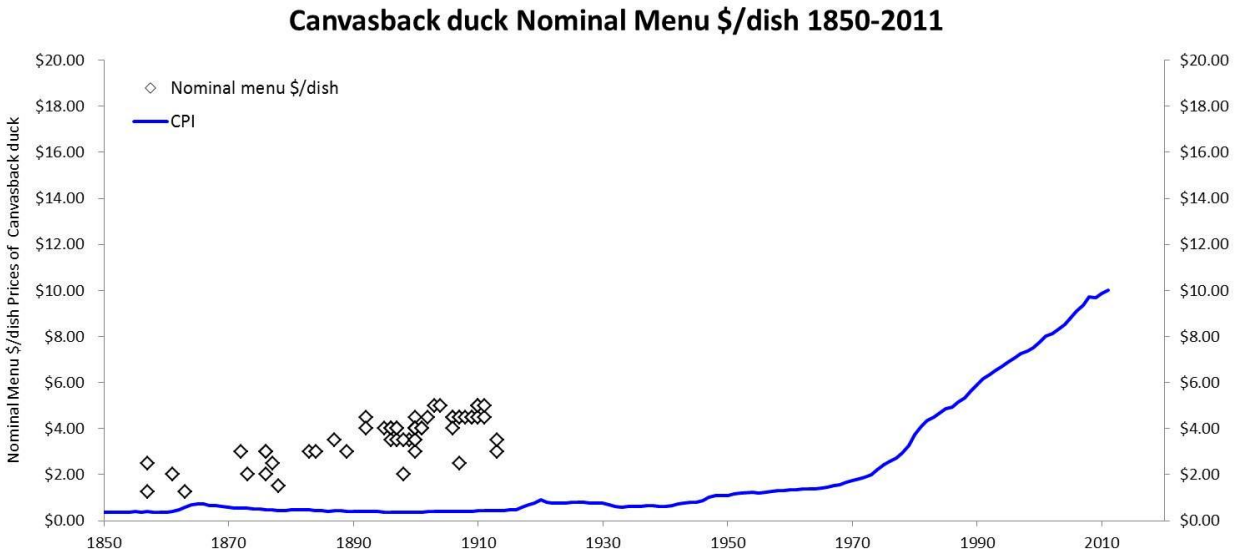


Figure 19a– Nominal menu $/dish of Canvasback duck entrees for 1850 – 2011 plotted with the Sahr CPI inflation adjusted 2011$ $1.00 equivalent to show that non-adjustment of prices is ill-representative of the price trend.

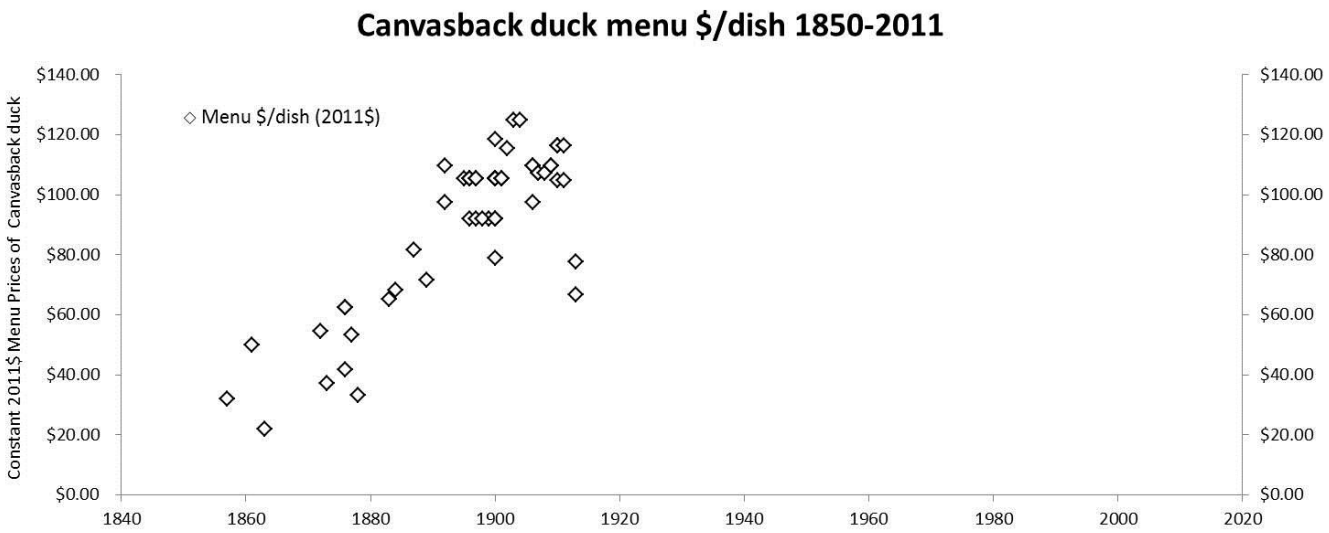


Figure 19b– Sahr CPI inflation adjusted 2011$ real prices of menu $/dish Canvasback duck entrees for 1850 – 2011.

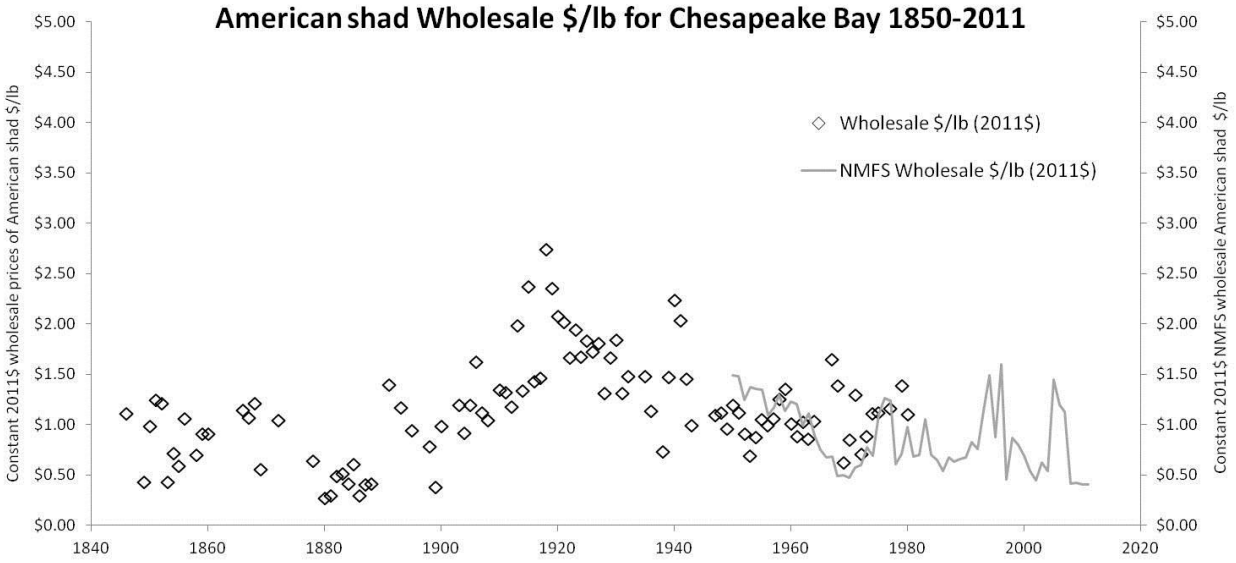


Figure 20–Annual average of Sahr CPI inflation adjusted wholesale market prices of $/lb for American shad of Chesapeake Bay from 1850 – 1980. Wholesale market prices are plotted with the NMFS American shad wholesale $/lb in 2011$ price equivalency from 1950 – 2011.

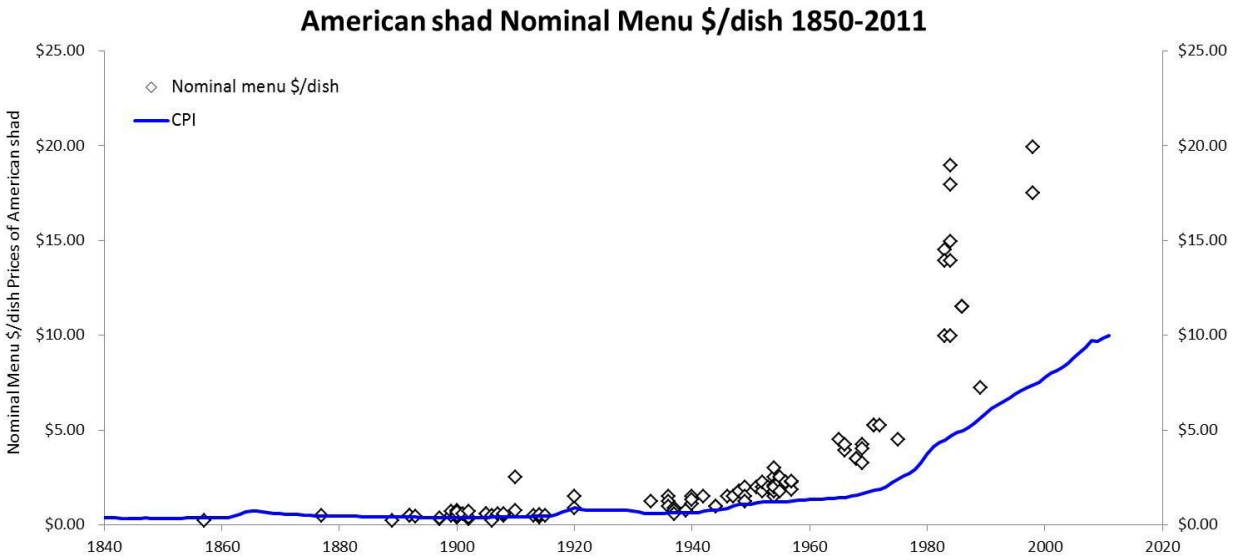


Figure 21a– Nominal menu $/dish of American shad entrees for 1850 – 2011 plotted with the Sahr CPI inflation adjusted 2011$ $1.00 equivalent to show that non-adjustment of prices is ill-representative of the price trend.

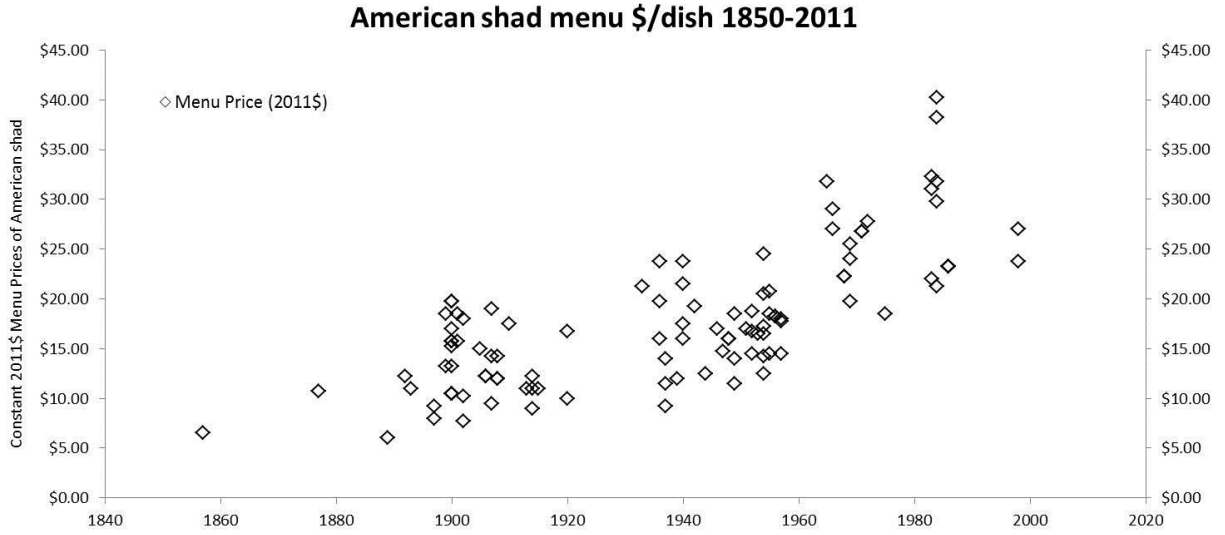


Figure 21b– Sahr CPI inflation adjusted 2011$ real prices of menu $/dish American shad entrees for 1850 – 2011.

Figure 22 –Sahr CPI inflation adjusted retail market prices of $/lb for Striped bass of Chesapeake Bay from 1850 – 1980. Retail market prices are plotted with the NMFS Striped bass wholesale $/lb in 2011$ price equivalency from 1950 – 2011. Retail market prices for $/lb were converted to represent hind-casted NMFS wholesale prices for 1850 – 1950.

Figure 23 –Annual average of Sahr CPI inflation adjusted wholesale market prices of $/lb for Striped bass of Chesapeake Bay from 1850 – 1980. Wholesale market prices are plotted with the NMFS Striped bass wholesale $/lb in 2011$ price equivalency from 1950 – 2011.

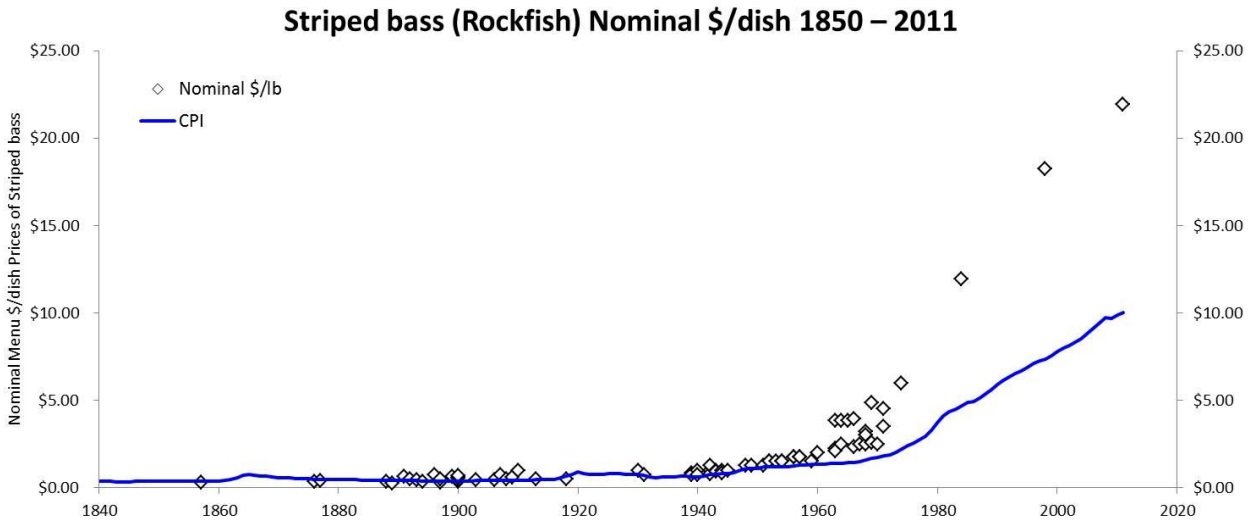


Figure 24a– Nominal menu $/dish of Striped bass entrees for 1850 – 2011 plotted with the Sahr CPI inflation adjusted 2011$ $1.00 equivalent to show that non-adjustment of prices is ill-representative of the price trend.

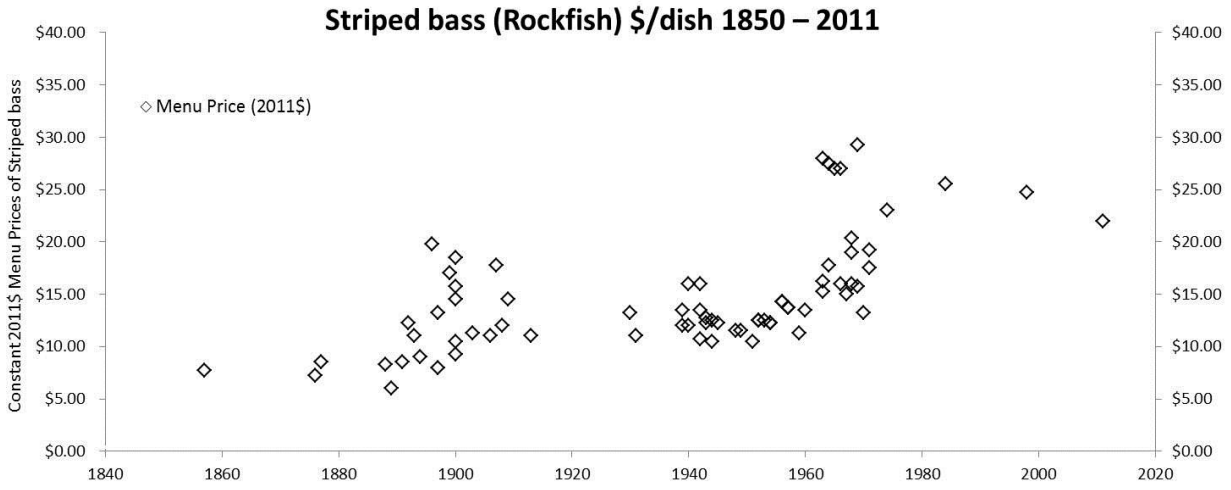


Figure 24b– Sahr CPI inflation adjusted 2011$ real prices of menu $/dish Striped bass entrees for 1850 – 2011.

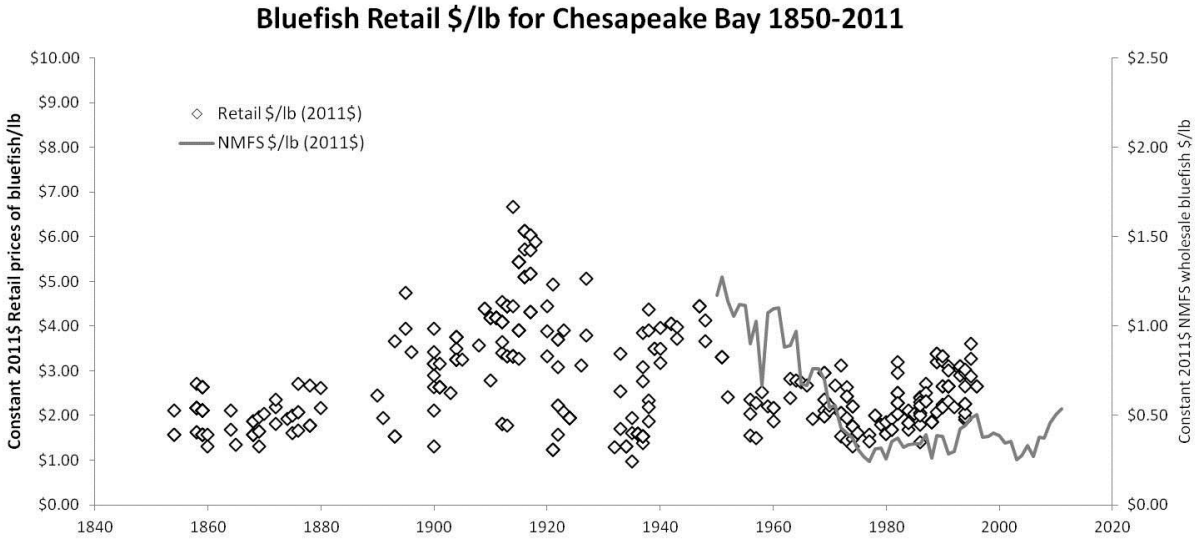


Figure 25 –Sahr CPI inflation adjusted retail market prices of $/lb for Bluefish of Chesapeake Bay from 1850 – 1980. Retail market prices are plotted with the NMFS Bluefish wholesale $/lb in 2011$ price equivalency from 1950 – 2011. Retail market prices for $/lb were converted to represent hind-casted NMFS wholesale prices for 1850 – 1950.

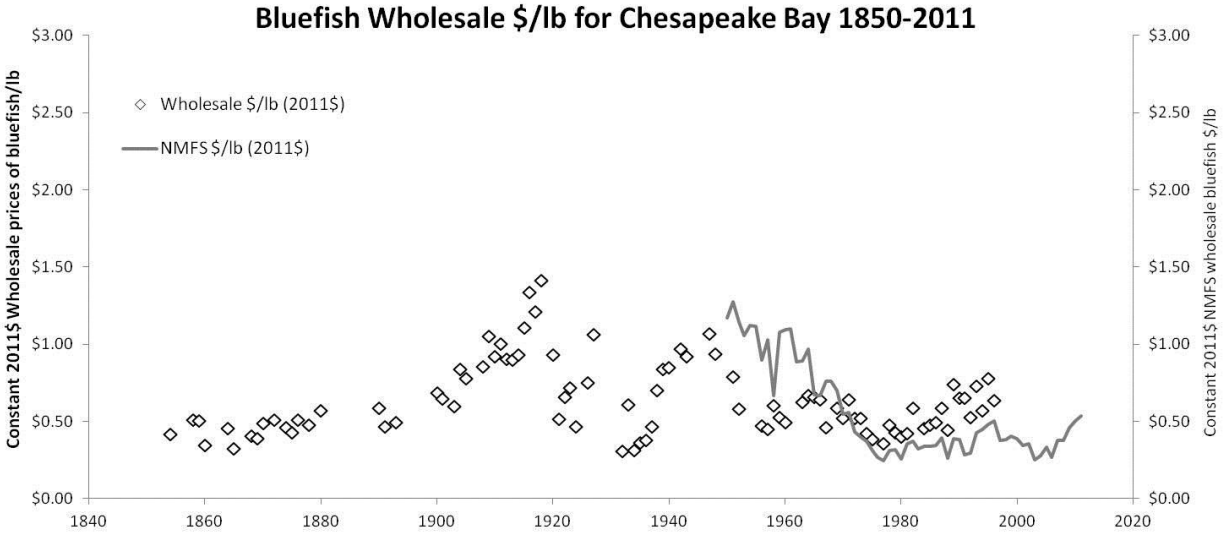


Figure 26 –Annual average of Sahr CPI inflation adjusted wholesale market prices of $/lb for Bluefish of Chesapeake Bay from 1850 – 1980. Wholesale market prices are plotted with the NMFS Bluefish wholesale $/lb in 2011$ price equivalency from 1950 – 2011.

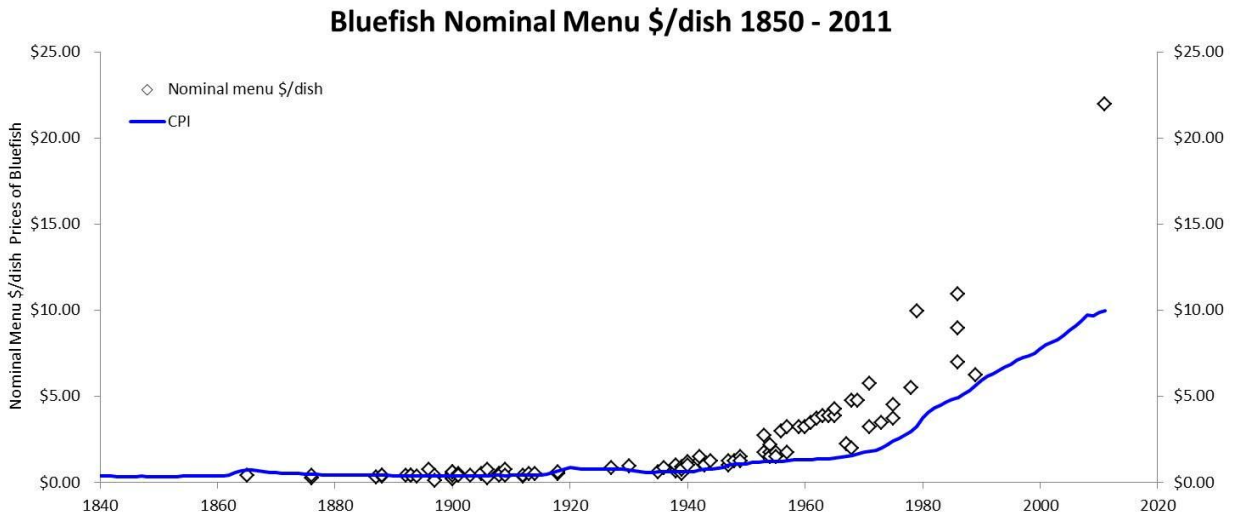


Figure 27a Nominal menu $/dish of Bluefish entrees for 1850 – 2011 plotted with the Sahr CPI inflation adjusted 2011$ $1.00 equivalent to show that non-adjustment of prices is ill-representative of the price trend.

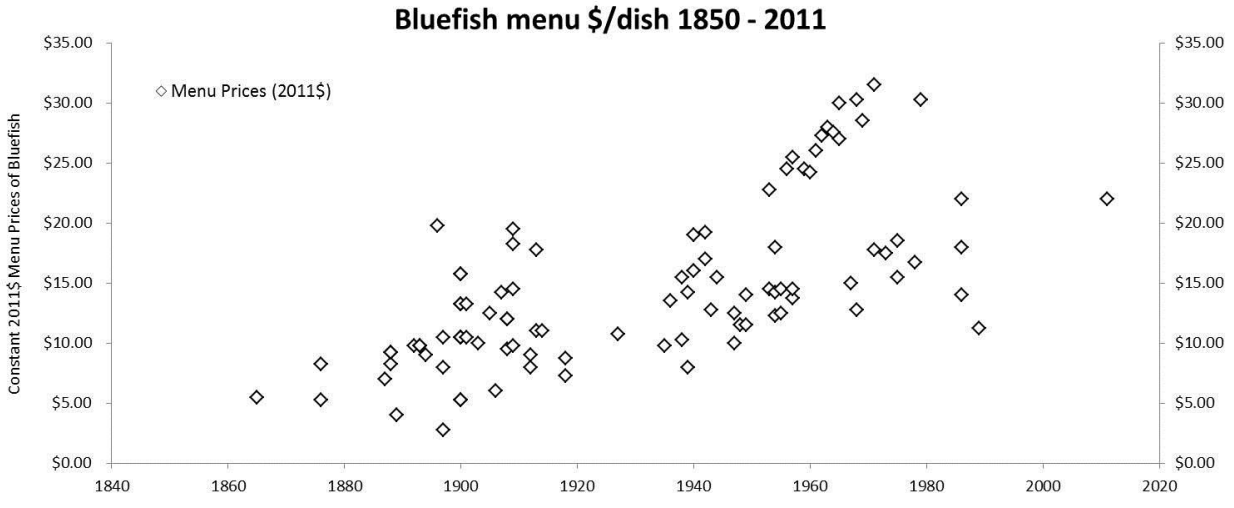


Figure 27b – Sahr CPI inflation adjusted 2011$ real prices of menu $/dish Bluefish entrees for 1850 – 2011.

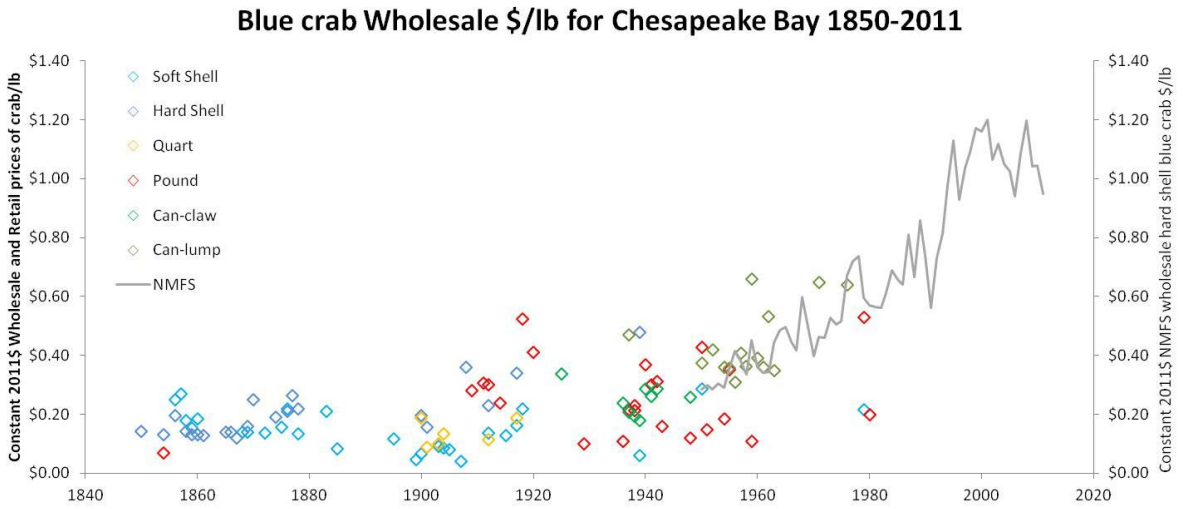


Figure 28 - Sahr CPI inflation adjusted wholesale market prices of $/lb for Blue crab of Chesapeake Bay from 1850 – 2011. Retail market prices for $/lb of Blue crab were converted to represent hind-casted NMFS wholesale prices for 1850 – 1950.

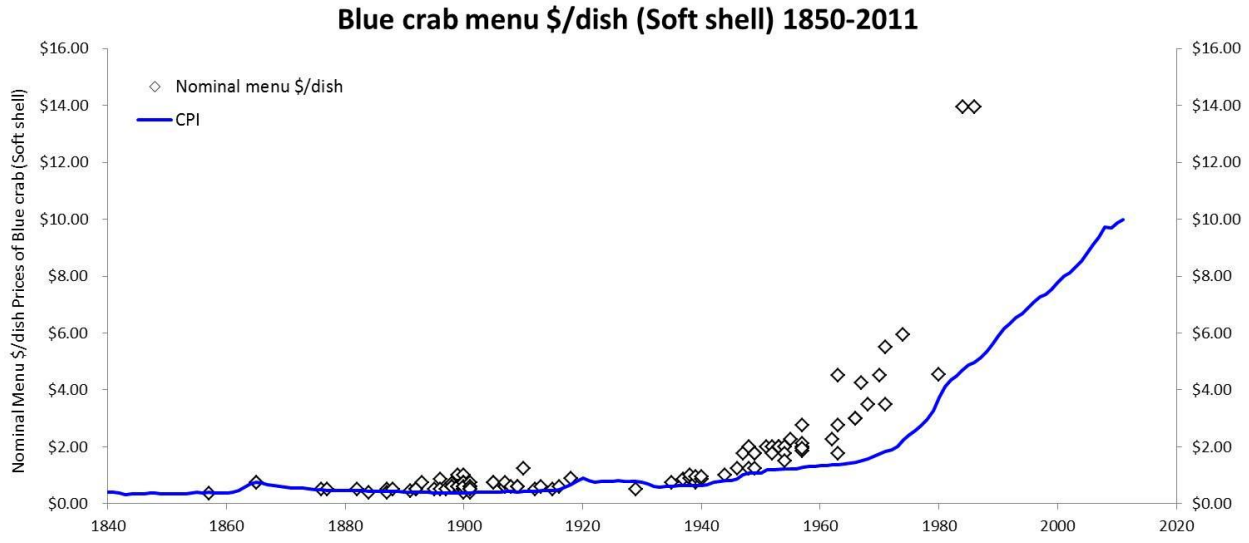


Figure 29a– Nominal menu $/dish of soft shell Blue crab entrees for 1850 – 2011 plotted with the Sahr CPI inflation adjusted 2011$ $1.00 equivalent to show that non-adjustment of prices is ill-representative of the price trend.

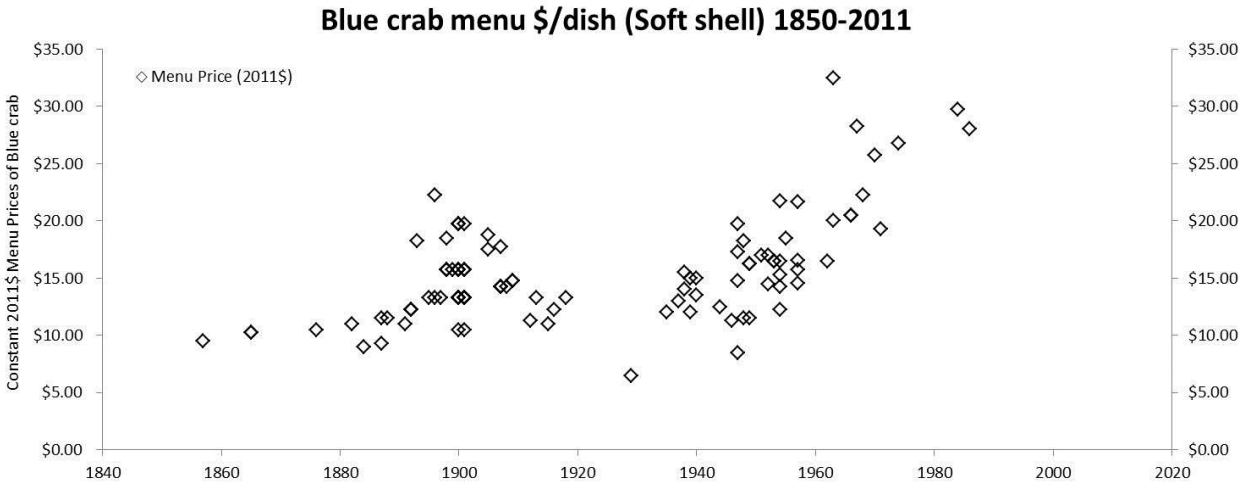


Figure 29b– Sahr CPI inflation adjusted 2011$ real prices of menu $/dish Blue crab entrees for 1850 – 2011.

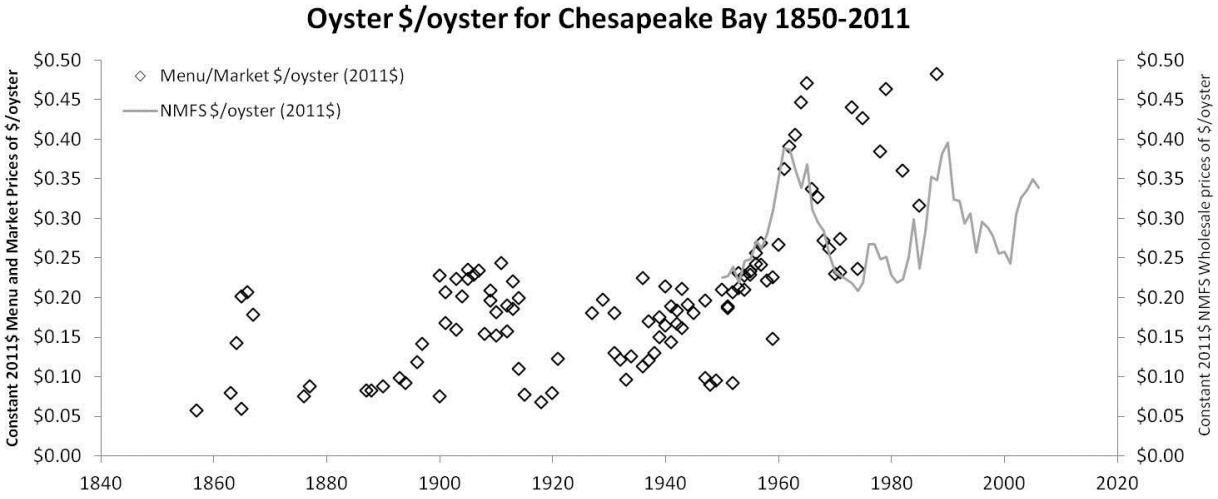


Figure 30– Annual average of Sahr CPI inflation adjusted menu and market prices of $/oyster for oysters of Chesapeake Bay from 1850 – 1980. Menu and market prices are plotted with the NMFS Oyster wholesale $/oyster in 2011$ price equivalency from 1950 – 2011. Menu and market prices for $/oyster were converted to represent hind-casted NMFS wholesale prices for 1850 – 1950.

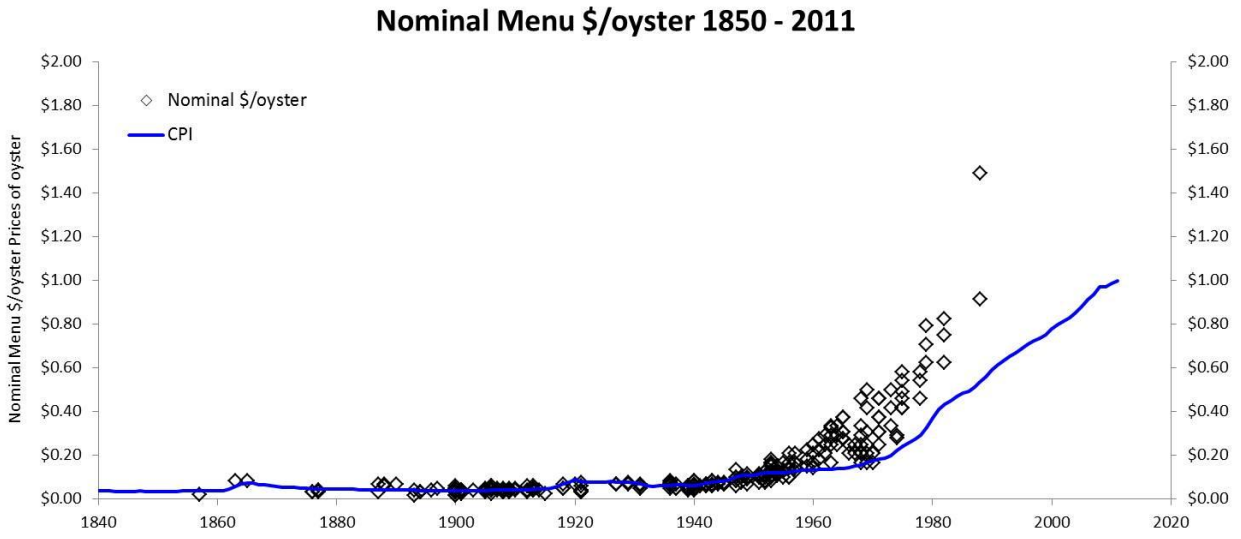


Figure 31a– Nominal menu $/oyster of Easter oyster appetizers for 1850 – 2011 plotted with the Sahr CPI inflation adjusted 2011$ $1.00 equivalent to show that non-adjustment of prices is ill-representative of the price trend.

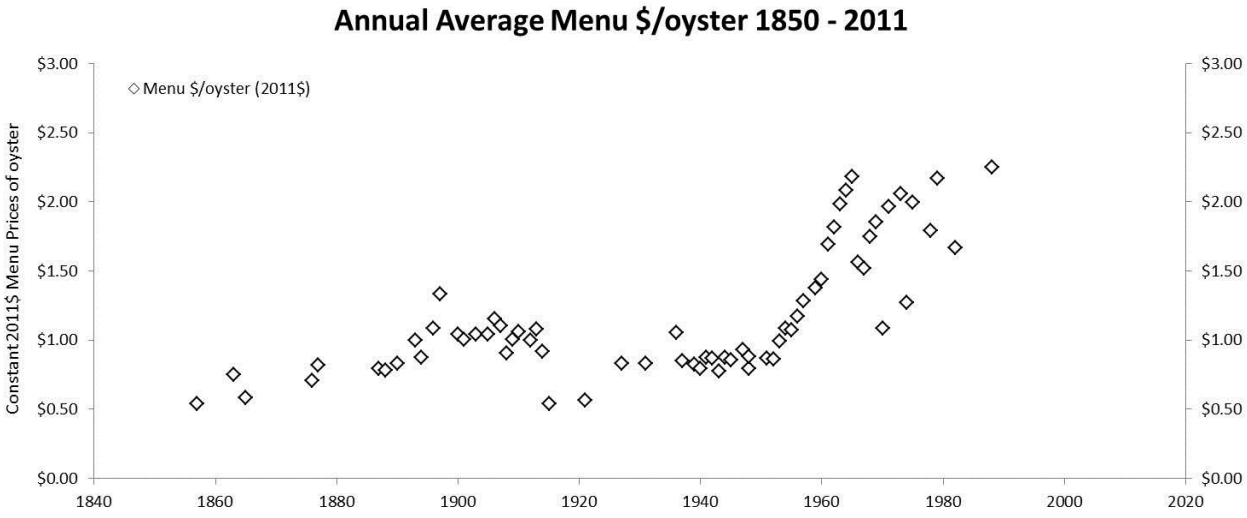


Figure 31b– Sahr CPI inflation adjusted 2011$ real prices of menu $/oyster Eastern oyster appetizers for 1850 – 2011.

CHAPTER IV

CONCLUSIONS

Diamondback terrapin

The reign of the Diamondback terrapin as an American delicacy was short-lived, becoming a coveted dish of the wealthy by the 1880s and declining in popularity by the 1920s. For reasons unknown, the market for terrapin in the Northeastern US was met with an abrupt decline, in effect becoming commercially extinct in northern portions of the terrapin's range (Hildebrand and Hatsel 1926). Concerns expressed in national newspapers of the period indicate that increasing 'extermination' rates would lead to the depletion of the resource.

To meet the growing demand and decreasing supply, terrapin farms were established in the southern states surrounded by the Gulf of Mexico, but also in Maryland and North Carolina (Anonymous 1891). It was believed that these farms would relieve the over-harvest of wild-caught terrapin (Anonymous 1896), but it proved to be an inadequate solution. These farms held wild caught terrapins in pens and bred them in the hopes of selling their offspring to market. Some farms had dogs that were trained to find terrapins and used during the extraction process (Anonymous 1881). Terrapins were not expensive to feed; however, there were biological, appetite, and profit issues that led to the closing of these terrapin farms. Biologically, the terrapin has a late maturity, often taking seven to eight years to reach its maximum size. It was not practical or profitable to raise terrapins for eight years to sell (Anonymous 1938). Terrapin eggs are sensitive to temperature and orientation changes when laid by the female, as this determines the sex of the offspring. Prior to scientific research on the species, this was not understood, so when farmers removed the eggs from nests they often altered the orientation of the eggs which

potentially changed the sex of the turtle. Females were preferred because they are larger and egg bearing; however, males often dominated the stock at farms likely due to the extraction process.

Wild caught terrapin were preferred to farm raised terrapin because they were more palatable. Terrapin raised on farms would often be sold to New York for consumption. It was a widely held belief that Chesapeake Bay produced much better tasting terrapin than those collected along the southern Gulf of Mexico which was reflected in the literature (Anonymous 1929). Terrapin were not expensive to feed; many farmers would seine for crabs and fish from waters within close proximity to their homes (Anonymous 1881). Due to the terrapin's slow maturity and change in appetite, operation costs rose faster than profits could compensate for.

Diamondback terrapin was first used as food for slaves, whom, according to *The Baltimore Sun* complained because they preferred to eat pork. Some few years later, terrapin had been regarded as a millionaire's dish, which only a millionaire could afford to put on their table (Anonymous 1898). A *New York Times* reporter commented about the dish:

> *To begin with, as to the various terrapin sold in market as genuine diamondbacks, none resembles or in any way compares in spicy flavor, juice, or tenderness with the real Malacoclemmys palustris, which is what the professors call the delicious creature of which you and I have just partaking* (Anonymous 1896).

He goes on to describe the best ways of preparing terrapin, so that guests can enjoy the delicacy at home. Terrapin were sold in high-class restaurants such as the Waldorf Astoria whereby prices

reflected their popularity and gourmet status. With rising popularity, an expected decrease in supply resulted. An article published in the *New York Times* February 15, 1891 expressed growing concerns for terrapin supply in an article titled "Our tables will suffer":

> *Fewer terrapin have been caught this year than ever before. The best come from the Chesapeake Bay, and the catchers all say that they never knew them to be so scarce. They have been hunted mercilessly, and, to add to the depletion, the eggs have been taken away by boys and men, who use them for food* (Anonymous 1891).

Some few years later, another article was published in *Baltimore American* January 21, 1903 titled "Sad day for the Epicures" stating:

> *Probability of the depletion of Maryland's oyster beds and the extinction of Chesapeake Bay terrapin, unless safeguards be employed without delay, were points brought out in a lecture by Dr. Hugh M. Smith, of the United States Fish Commission , which deeply interested a large audience at the Peabody Institute last night* (Anonymous 1903).

The 1890s and 1900s experienced the highest prices in terrapin when they sold for $75.00 (US$1,923.08 in 2011$) to $100.00 (US$2,564.10 in 2011$) per dozen in 1894. High prices were experienced in 1902 as well, at $60.00 (US$1,538.46 in 2011$) to $100 (US$2,564.10 in 2011$) per dozen terrapin. The prices began to decrease following these years likely due to the decrease in supply and scare of extermination of the species. Prohibition began in 1920, which banned the sale of alcohol. Sherry and Madeira wine were primary ingredients used when preparing terrapin;

therefore, the removal of these substances from the market changed the interest of those once attracted to the delicacy. This change in appetite led to the removal of Diamondback terrapin from menus and wholesale and retail markets.

Canvasback duck

Canvasback ducks had been hunted mercilessly when present in Chesapeake Bay, as well as, when they continued migrating southward. When captured and killed in the south, they were sold back to northern states such as New York and Maryland to support the demand for the delicacy. An article published November 15, 1905 in the *Baltimore American* stated:

> *Buffalo, diamondback terrapin, and scores of other food and fur-bearing creatures that in years gone by were plentiful are now numbered among the few, and mankind has been responsible. When only the bow and arrow were used a man could kill but few ducks in a day, but with the advent of the breech-loading shotgun a man's "kill" is only limited by the number of ducks that get within his range. That is why ducks are becoming so scarce* (Anonymous 1905).

Canvasback duck, along with Diamondback terrapin, were short-lived, high-priced delicacies that often accompanied each other on menus. Canvasbacks, being the largest of the diving ducks in Chesapeake Bay, were sought after for their succulent meat and at times colorful feathers. According to an 1887 article published in *Forest and Stream*:

> *Ducks are found in abundance in other tributaries of the Chesapeake, in Albemarle and Pamlico sounds, in North Carolina, in Florida, in tributaries to the Gulf of Mexico, and in many other bodies of water, but they have no such flavor of the canvasbacks, black, and blue heads that feed on the flats at the mouth of the Susquehanna River. The flavor is due to the peculiar diet upon which they feed. This is the wild celery* (Anonymous 1887).

Popularity of Canvasback as a food commodity was reflected in gastronomical menu and market prices. These ducks were a luxury item often being featured on menus of 'five-star' rated restaurants such as the Waldorf Astoria, Plaza, Hotel Aster, and Delmonico's (Jones 2008). No expense was spared when dining on this delectable dish. As such, the apparent plenitude of the Canvasbacks, which had become largely demanded by consumers, was in decline (Jones 2008). At the closing of the 19th century, it became increasingly evident that drastic measures were needed to prevent the extinction of the waterfowl (Jones 2008).

Initially several states passed legislation banning the export of wildfowl and game birds across their borders, and New York prohibited the shooting, or possession, of migratory waterfowl in the spring. Despite states efforts, the number of illegally shot and transported migratory birds remained high (Jones 2008). US Fish and Wildlife Service passed the 1918 Migratory Bird Treaty Act deeming it unlawful to sell or transport these listed migratory birds across national, international, or state lines (FWS 2012). Canvasback ducks were one of the bird species that benefited from this act of legislation. Henceforth, the large-scale commercial shooting ceased and restaurants were unable to serve Canvasback ducks and any other protected migratory species (Jones 2008).

Shad

Once widespread, the fishery for shad in the Atlantic, including Chesapeake Bay, is now greatly reduced but remains important in a few remaining waters. Historically, American shad were among the most abundant and economically valuable fishes of Chesapeake Bay (Loesch and Atran 1994; Hildebrand and Schroeder 1928). Their serial decline in abundance during the last century has brought about strict regulation by a moratorium on directed fishing (Alosine Species in the Chesapeake Bay). In 1900, an estimated 12,000,000 pounds were harvested from the Bay alone. By the time the NOAA Fisheries Statistics and Economics Division began baseline data collection of fisheries in 1950, the commercial landings of shad in the Bay had been reduced to just under 4.5 million pounds (NOAA Fisheries Statistics).

In the 1700s, this bountiful and valuable resource was subject to harvest for food, bait, and fertilizer. As a result of early harvests, declines of anadromous fishes, notably American shad, were observed as early as the 1700s. In 1880, the average annual price of shad reached the lowest cost between 1850 – 2011. By 1915-1918, the price for shad reached its highest within the last century, owing its demand to the value of its meat and roe. Most prized was the Roe shad, or egg-bearing female, for which the highest dollar amount was afforded. By the 1920s, contemporary articles reported a scarcity of shad and inability to meet market demand. Spawning programs instituted by the Federal government to relieve the harvest were closed, and the shad industry was largely abandoned by commercial fishermen. Due to a demand that could not be met, the shad as a menu staple likely fell out of favor as new fish surfaced in markets.

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Striped Bass

The Chesapeake Bay is the spawning and nursery habitat for 70-90% of Atlantic stocks of Striped bass (Striped Bass 2013). Populations in the Bay and other areas of harvest have a history of periods of abundance interspersed with periods of scarcity (Striped Bass 2012). Wholesale and retail $/lb prices demonstrate 30 to 40-year cycles of periods of elevated prices followed by periods of low price. Landings reported by NMFS were instituted in 1950 midway at the peak of one cycle which began in 1935 (Figure X). This pattern in price demonstrates at least three complete 30 to 40-year cycles of this behavior (Figure X). The normal patterns of abundance were disrupted in the 1970s when landings reached the highest level in the last century. Reports of fishermen urging the need to reduce the catch of rockfish to a defined season rather than the year-round fishing that was taking place began to surface during the late 1940s:

> *What we need is a closed season on rock* [striped bass] *to keep the prolific 8 to 12 pounders around. They are the real roe depositors. Even a fish as sturdy as the rock can't survive the all-year pounding they're getting.*

Closed Period On Rockfish Badly Needed (Anonymous 1948)

By the early 1980s catches had fallen to the lowest level since 1950 (Figure X) and catch statistics, spawning stock assessments, and juvenile indices indicated that the production of age 0+ striped bass had declined below levels necessary for replacement of the spawning population (Secor 2000). In the years prior to the early 1980s, few restrictions governed the capture of striped bass in coastal marine waters (On January 1, 1985, a moratorium on the commercial and sport fishing harvest of rockfish in Chesapeake Bay was imposed (Figure X) in by the state of Maryland at a time when the fish sustained what was the most valuable finfish fishery of the Bay (Anonymous 1990). By 1989 scientists considered the fishery restored due to a high abundance of 0+ striped bass in the Bay in number exceeding the trigger level prescribed by the Atlantic States Marine Fisheries Commission (ASMFC) (Secor 2000). Reopened in 1989, the fishery continues to be of great economic importance for the Bay (Secor 2000).

Bluefish

The bluefish has largely been a popular recreational sport fish and today is seldom considered an important food source. Its past and current nature as a commercially sought species warrants further investigation. We can report that retail $/lb prices reveal that post 1900 bluefish catches demonstrate a 20-year cyclical pattern (Figure X). Retail prices appear to be higher despite a decrease in wholesale price. It must also be noted that bluefish catches increased with the decline and closure of the striped bass fishery in 1985. Like the striped bass, bluefish occupy a high predatory status in the bay and adjacent waters and could have replaced the striped bass in catch popularity as the striped bass declined in availability.

Blue Crab

Prior to 1950, most every crabber trotlined; it was not until the 1950s that crab potting really took off in Maryland waters (Anonymous 1984). The easier potting technique quickly caught hold as an efficient means to catching crabs; trotlining and dip netting is often only practiced for sport (Anonymous 1984). Though popular, potting is only legal in the Bay proper and Potomac River (Lippson 1973). In 1960, almost half of the crabs caught along the Atlantic coast were harvested from Chesapeake Bay (Anonymous 1960).

In 1985, a workgroup under the Sustainable Fisheries Goal Implementation Team (Fisheries GIT), known as the Chesapeake Bay Stock Assessment Committee (CBSAC), was created for providing scientific based recommendation on blue crab management decisions. Each year, CBSAC produces an advisory report to advice management according to jurisdictions set forth regulations for the blue crab fishery (NOAA statistics 2012). During the last decade (2003 – 2013), populations in Chesapeake Bay reached some of their lowest numbers due to overexploitation and habitat degradation. In response to prolonged low abundance, CBSAC recommended new management decisions since 2008 when it was declared a federal disaster (NOAA statistics 2012).

Prior to this, no legislation was enacted for means of protecting blue crabs from overharvest. Supply of blue crab has always met demand through the period of 1850 – 1950. Compared with other species in the study, it has remained a sustainable fishery and one of the most important for Chesapeake Bay. The Blue crab fishery continues to sustain high harvest today. Blue crabs are

perhaps the most sought-after shellfish in the mid-Atlantic region, being caught commercially and recreationally (NOAA statistics 2012).

An article was published in *Lippincott's Monthly Magazine* February 1895 stated:

> *The great Chesapeake Bay is an inexhaustible storehouse of gastronomic wealth. Immense numbers of canvas-back ducks and Canada geese find a winter home on its landlocked and placid bosom. The bottom of the bay is a vast oyster-bed, the amplitude of which can be estimated only in square miles, and its contents in millions of bushels. Between the wild duck above and the oyster beneath, there are three inhabitants of these shallow waters which possess peculiarities strongly recommending them to popular favor. They are the shad, the crab, and the diamond-back terrapin. It may be said that the shad are there in millions, the crabs in thousands, and the terrapin in hundreds, for this is the relative proportion in which they are found and caught* (Anonymous 1895).

Hard shell crabs constitute the majority of total poundage landed in Maryland; however, a small but intensive fishery specializes in harvesting the much sought-after soft shell crabs. Soft crabs, often seen on menus and markets as "soft shell crabs", have just completed a molt. Blue crabs undergo frequent molting periods during their first year of growth; subsequent molts also occur once maturity is reached (Lippson 1973). This molting period softens the crabs shell, thus, producing the "soft shell crabs". Soft shell crabs are considered more of a delicacy than hard shell crabs and were much more expensive in both restaurants and wholesale or retail markets. When molting, the entire shell can be eaten with the crab meat.

Oyster

Oysters are traditionally said to be eaten in the months that end with 'r'. This tradition originated because of two factors; historically, refrigeration was not available, so oysters were not good to eat in the warmer months because they spoil quickly if they are not chilled. Secondly, the warmer months are biologically poor for oyster quality (Lippson & Lippson 2006). Oysters spawn early in the summer, at which point they become thin and watery to exert most of their energy into spawning. As fall approaches, oysters become more robust with greater palatability. Oysters can be eaten year round because of refrigeration, but they are most delectable in the months from September to April (Lippson & Lippson 2006).

By the 1820s, oysterman began selling oysters from oyster wagons. Oysterman would fill empty two gallon kegs, with oysters to take home and shuck; refilling the kegs with oyster meat (Galpin 1989). Later, oyster shops were built along the banks and over the water's of Chesapeake Bay. Oysters arriving here, were culled, or sorted according to size, shucked, packaged and shipped. This continuous expansion of harvest and processing depleted the wild standing stocks (Galpin 1989). By 1830, demand exceeded the supply.

In 1867, the use of seed oysters was found to be potentially successful for growing oysters and marketing for profit and many believed this to be the most successful plan for relief of over-harvesting (Lippson 1973). Cultivation of native seed had begun. Seed transplanting is the basis for extensive rehabilitation efforts of oyster beds of Chesapeake Bay. Difficulty arose in protecting these planted oyster beds from theft as these underwater lots were considered public

(Galpin 1989). Protective legislation was needed, but protection of private beds was unsuccessful until 1881 with the passage of the State Shellfish Commission.

Harvests have been low since the 1980s, initially due to overharvesting (Wilberg et al. 2011; Jackson et al. 2001; Rothschild et al. 1994); however, the diseases MSX and Dermo have also played an important role in oyster demise since the 1950s (Wilberg et al. 2011; Ford & Tripp 1996; Burreson & Ragone Calvo 1996; Andrews 1988). Prior to the mid-1980s, these diseases were restricted to high salinity regions in the Bay (Wilberg et al. 2011;Burreson & Ragone Calvo 1996), but by 1986, Dermo had expanded to areas previously unaffected causing widespread mortality. MSX largely remained restricted to high salinity regions, fluctuating every year (Wilberg et al. 2011; Tarnowski 2007). The overall effect on oyster populations from overharvest and disease is not well catalogued (Wilberg et al. 2011); however, the market and menu prices have reflected a potential decrease in supply while demand has remained high.

Conclusions

The data sources examined for this study demonstrate the utility of retail market and menu prices reported in historical newspapers, price current lists, and regional menus in charting market trends and consumer preferences since the mid-1800s. In the late nineteenth and early twentieth centuries, these species constituted a large part of the commercial catches in Chesapeake Bay and adjoining tributaries and were of great economic importance to fishing industries of the region. In many cases, regional market price movements were largely commanded by the forces of demand and supply, with growth of the former leading to the depletion of the populations that supplied the market. As the supply dwindles, food items become increasingly scarce and

therefore costly, thus affecting patterns of demand as consumers chose to either purchase costly items– because of the social status afforded by the purchase of such 'emerging' luxuries – or to buy cheaper alternatives.

Databases continue to be constructed that feature digitized menus, newspapers, price current lists, and periodicals, all of which may contain useful retail prices. Ultimately, the fate of a seafood item is determined by the consumer, who will decide how much they are willing to pay for a particular seafood item as a species becomes scarcer and the price increases or a new item emerges to the market. It is consumer demand for cheaper alternatives that will dictate which species are fished for to supply that demand. Novel research methods such as these demonstrated here, may well elucidate explanations for the decline of wild stocks of popular seafood items prior to 1950 and reveal, with confidence, standing stock levels closer to that of natural baseline stock abundances before industrial-scale harvesting began – emphasizing the goal to enhance the knowledge and understanding of how the diversity, distribution and abundance of marine life has changed over the long term.

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