

FISH REMAINS

by

Peter D. Schulz

Archaeological Consulting and Research Services  
Santa Cruz, California



## INTRODUCTION

The fish remains analyzed in this report were recovered during a recent archaeological excavation of 19th-century urban deposits in Sacramento, California. Remains such as these are of potential importance because little quantitative information is available on California's fisheries in the last century. Even less is known of the fish populations upon which these industries depended or the role of fish in the urban diet at that time. Remains such as those reported on here are also potentially useful in providing information on the chronology and seasonality of deposition of the archaeological strata themselves.

While the present collection is relatively small and consequently of limited value in itself, it nonetheless represents the most productive single archaeological feature yet studied in the city; results can be compared with other collections from 19th-century Sacramento (Schulz n.d.) to provide a fuller picture of the role of fish during this period.

## SITE DESCRIPTION AND METHODS

During the summer of 1979, excavations were conducted by the Sonoma State University Cultural Resources Facility on the J/K/6/7 Block in northwestern Sacramento. This block is situated in the city's early commercial district, and all the deposits encountered were within or adjacent to the site of the Golden Eagle Hotel, a prominent Sacramento enterprise from 1851 to the middle of the present century.

Of the investigated deposits, three chronologically well-controlled units yielded fish remains. These three proveniences are: (1) Feature 6, a deposit built up beneath the floor of the Golden Eagle Oyster Saloon (1874-1878), yielding a ceramic terminus post quem of 1870; (2) Feature 15, a brick-lined pit with a ceramic terminus post quem of 1866, also probably associated with Cronin's oyster saloon; and (3) Feature 20, another brick-lined pit, which had a ceramic terminus post quem of 1856 and was associated with the operation of the Golden Eagle Hotel in the early 1860s.

Earth from Feature 20 and half of the material from Feature 15 was passed through 1/8-inch mesh screens; 1/4-inch mesh was used for the remainder of Feature 15 and for soil in Feature 6. The recovered bone was saved, cleaned, and sorted; and the fish bone was submitted to the author for identification.

Soil samples were taken from all features. Later, these were passed through 1/8-inch mesh screens and the residue carefully sorted. This process was completed too late for incorporation of the data into the body of this report. Appendix 2.1 lists identifiable fish remains recovered.

## RESULTS

A total of 278 identifiable fish bones was recovered from the three features, most of which (97 percent) came from Feature 15. At least 29 individual fish of ten species are represented among the remains (table 2.1)

### SACRAMENTO PERCH

The most common fish in the Golden Eagle collection was the Sacramento perch (*Archoplites interruptus*). Until late in the last century, this species was extremely abundant in the lakes and sloughs of the lower Sacramento-San Joaquin Valley, and its bones outnumber the remains of all other fishes in prehistoric Indian middens near Sacramento (Schulz and Simons 1973; Schulz, Wagner, and Domning 1976).

The "strings of pan fish" which were sold by native fishermen to the first overland party of 1846 when it reached Sutter's Fort (Bryant 1936:243) were undoubtedly Sacramento perch, and it is noteworthy that this fish, alone among the native freshwater species of the state, has maintained a consistently excellent gastronomic reputation ever since (see appendix 2.2). Known during the last century merely as "perch" or, rarely, "bass," they were a common element of local restaurant menus during the 1850s and 1860s (Askin 1978; Sacramento Bee 3 February 1862:2). Unfortunately, Sacramento perch had little success in surviving the major habitat changes brought about by the reclamation of marshlands and the introduction of exotic fish species which began in earnest in the 1870s.

In the late 1870s, Sacramento perch were still considered "abundant" by observers of the market (Lockington 1879b), but fishermen were already noting a decline in their numbers:

In the early days the run of perch was quite large. Fishermen have been known to take in Brannan Slough in one day as much as 3,600 pounds. As late as 1869 it was a common thing to take from 500 to 1,000 pounds daily in that slough. Since that time they have been getting less and less each year, until now there are weeks at a time that there are none to be seen in the local markets. The decrease is fully 98 per cent,... the cause of which, for one thing, is the reclamation of the tule lands, which has closed all of the sloughs by which they entered the lakes to deposit their ova (Sacramento Record-Union 9 February 1884:5).

Except for a brief revival (in 1884 and 1885) attributed to breaks in the levees which permitted spawning over the tule lands (Dibble et al. 1884; Buckingham et al. 1886), the population continued downward. By the beginning of the present century, commercial landings had declined to insignificance, and within a few decades Sacramento perch had been eliminated from all the open waters of their native habitat.

TABLE 2.1

## Fish Remains from the Golden Eagle Excavations, Sacramento

(Number of elements/Minimum number of individuals)

<u>Common Name</u>	<u>Species<sup>1</sup></u>	Cronin's Oyster Saloon		Golden Eagle Hotel
		<u>Feature 6</u>	<u>Feature 15</u>	<u>Feature 20</u>
Sacramento perch	<i>Archoplites interruptus</i>		187/11	
Thicktail chub	<i>Gila crassicauda</i>		23/6	
Sturgeon	<i>Acipenser</i> sp.		18/1	
Rockfish	Scorpaenidae		13/2	
Lingcod	<i>Ophiodon elongatus</i>		12/1	
Cod	<i>Gadus</i> sp.	2/1	4/1	6/1
Jacksmelt	<i>Atherinopsis californiensis</i>		6/2	
Surfperch	Embiotocidae		4/1	
White seabass	<i>Atractoscion nobilus</i>		2/1	
King salmon	<i>Onchorhynchus tshawytscha</i>			1/1
TOTAL		2/1	269/26	7/2

<sup>1</sup>

Scientific names follow Hubbs, Follett, and Dempster (1979).

### THICKTAIL CHUB

The second most common fish in the collection, the thicktail chub (*Gila crassicauda*), a large minnow, is also one of the most interesting since it is probably now extinct. Reports of 19th-century fisheries suggest that this species was then a common component of the Sacramento fishery, although such reports regularly confused various species of minnows under overlapping popular names. More definitive evidence is provided by studies of fish remains in local prehistoric middens: chubs are among the most numerous of fish species in the sites studied, and in one historic Patwin village on the middle Sacramento, they were the most abundant species in the fauna (Schulz and Simons 1973; Schulz, Wagner, and Domning 1976; Schulz 1979). These studies lend considerable weight to reports that chubs were abundant in the lower Central Valley at least as late as 1888 (Collins 1892:123), but the population--like that of the Sacramento perch--seems to have gone into permanent decline shortly thereafter. Chubs were not even mentioned in studies of the early 19th-century commercial fishery (Croker 1934), and only two specimens have been observed by biologists since 1938. Nineteenth-century assessments of their gastronomic reputation differ, but on the whole, chubs were not preferred (see appendix 2.2).

### COD

Although their remains were not abundant, cod (*Gadus* sp.) are unique in the collection in being represented in all three archaeological features. The remains could represent either Atlantic cod (*Gadus morhua*) or Pacific cod (*Gadus macrocephalus*). The bones of this genus exhibit considerable individual variation, and it has not been possible to isolate specific differences among the elements in the Old Sacramento collections.

Salted Atlantic cod were being shipped around the horn to San Francisco even before the Gold Rush (The Californian 26 January 1848:1), and they were being advertised in Sacramento by 1850 (Placer Times 30 June 1850:3). The large cod populations of the North Pacific were not discovered until 1857 and the commercial fishery did not begin until 1863 (Cobb 1927).

Since cod appear only occasionally on available local 19th-century menus (Askin 1978), they may not have been esteemed for flavor. There is little information in the fisheries literature regarding cod's popularity, and it is possible that the taste of cod was so universally known that no one felt the need to comment upon it. Salted cod were certainly more troublesome than fresh fish, since they required overnight soaking, before cooking, to leach out the salt. They had, however, the advantage of being storable for extended periods of time, thus avoiding the vagaries of supply that afflicted the fresh fish market.

### STURGEON

California waters contain two species of this fish, white sturgeon (*Acipenser transmontanus*) and green sturgeon (*A. medirostris*). Although the two species could not be distinguished on the basis of skeletal remains, in view of the extreme prejudice against green sturgeon in the last century (see appendix 2.2), the bones in the present collection probably derive from white sturgeon.

These primitive fish attain the greatest size of any species on the Pacific coast, sometimes reaching weights in excess of 1000 pounds. Specimens brought to market averaged 15-50 pounds (Redding et al. 1877:13; Lockington 1881:58; Collins 1892:163). The flesh is now generally considered excellent eating, and the fish have attracted an avid sport fishery, but their reputation in the last century was less secure. Accounts of the period repeatedly noted that, while sturgeon comprised an important part of the fishery, they were usually not much favored; much of the meat was sold in restaurants masquerading as "sea bass" or "tenderloin of sole" (see appendix 2.2). The latter name is listed on the menu of an 1869 banquet held at the Golden Eagle Hotel for the directors of the Central Pacific Railroad (see Gust and Schulz, this volume), suggesting that the imposture may not have been too seriously regarded in upper-class circles.

#### KING SALMON

King salmon (*Oncorhynchus tshawytscha*) were popularly known in the last century as quinnat salmon or Sacramento salmon. The salmon fishery of the Sacramento was the first commercial fishery established on the coast and the most important. Adult fish moved up the Sacramento from the ocean to spawn in two major runs, the spring run being larger than that of the fall and yielding fish of better flavor. Average weight of these fish was 15-20 pounds (Kirkpatrick 1860:56; Collins 1892:162).

#### JACKSMELT

Jacksmelt (*Atherinopsis californiensis*) were popularly known in the last century only as smelt, a designation which was also applied to several other species. *Atherinopsis* was by far the most abundantly represented "smelt" on the market and, when any distinction was made, the most preferred. The fish weighed from 1/3 to 1 pound (Collins 1892:122).

#### WHITE SEABASS

Known in the 19th century only as sea bass or as sea trout, this large species (*Atractoscion nobilis*) reached weights in excess of 100 pounds. Average weight of market fish, however, was about 15 pounds (Jordan 1884a:37; Collins 1892:121). Their rating as a table fish was consistently high (see appendix 2.2).

#### LINGCOD

Lingcod (*Ophiodon elongatus*)--cultus cod or green cod in the terminology of the time--resembled the true cod in size and general appearance, although being of a separate family. Weight averaged 10-15 pounds (Collins 1892:120).

#### ROCKFISH

Some 50 species of this family (Scorpaenidae) are native to San Francisco Bay or the adjacent coastal waters. They vary greatly in their commercial importance, but as a group they seem to have been highly valued (see appendix 2.2).

## SURFPERCH

This family (Embiotocidae) is represented by 18 local marine and 1 freshwater species. The only elements in the collection are four vertebrae from a relatively large fish. Interestingly, the vertebral bodies exhibit a marked anterior-posterior compression and associated osteophytosis. This kind of spinal deformity has been reported in pile surfperch (*Damlichthys vacca*) (Tasto 1978), and it is also mirrored precisely in a rubberlip surfperch (*Rhacochilus toxotes*) in the U. C. Davis Museum of Anthropology (No. 5099) examined during this study.

Marketed surfperch averaged about one pound (Cronise 1868:488). They were generally rated as of little account commercially (see appendix 2.2).

## DISCUSSION

The implications of this collection for interpreting the archaeological deposits relate to questions of chronology, seasonality, and economic status. Because the collection is small, the following comments must be considered provisional.

### CHRONOLOGY

The species present in the samples offer little in the way of chronological information, except that the relative prominence of Sacramento perch and thicktail chub surely indicates that Feature 15 predated the turn of the century, by which time these species had been virtually eliminated from the commercial fishery.

More suggestive is the complete absence from the collection of any exotic species. In 1871 federal and state fish commissioners began introducing what was to become a long series of exotic fishes (Shebley 1917; Moyle 1976). Many of these species--particularly carp and catfish--were extremely successful and rapidly dominated the state's inland waters and its freshwater commercial fishery. Catfish, for example, were first introduced into lakes near Sacramento in 1874; by 1877, they were already furnishing "an important addition to the fish food supply of the City of Sacramento and vicinity" (Redding et al. 1877:24). By 1888 landings of catfish at Sacramento were surpassed in weight only by those of salmon and exceeded the total of all other freshwater species combined (Collins 1892:169). It is not surprising, then, that of the fish-bearing deposits thus far examined from Sacramento, all those dating after 1880 have yielded remains of catfish or carp (Schulz n.d.). In light of these data, it seems likely that deposition of Feature 15 predated 1880.

### SEASONALITY

When this study began, it was hoped that seasonal occurrence in the market of the identified fish species would aid in determining the season of deposition of the archaeological features. Unfortunately, most of the recovered fish would have been abundantly available throughout the year, and reports of the seasonal availability of the other species are somewhat contradictory. White seabass were variously reported as being avail-

able from February through October (Lockington 1879b:55), May through October (Buckingham et al. 1886:9-10), and July through November (Collins 1892:121). Sacramento perch were reported by Lockington (1879b:55) as present in the market from February through September, while Collins (1892:121) described them as being "taken in great numbers from October to March." Except for agreement that seabass were absent from the market in December and January, then, this information is of little value.

## ECONOMIC STATUS

It was known at the beginning of this study that strong popular prejudices were involved with the table values applied to various fish species. These prejudices would affect behavior, which, in turn, would be reflected in the archaeological record. In brief, it was expected that highly esteemed fishes would have cost more and would therefore be recovered with some consistency from archaeological deposits deriving from high-status establishments. Poorly rated species, by contrast, would have been the table fare of the lower socioeconomic groups and would be recovered from deposits associated with their status.

All three features, in the present instance, had some connection with the Golden Eagle Hotel, and, though they may have derived from enterprises operating under separate management, the proximity of these businesses to the hotel strongly suggests that they were serving the same upper-class and upper-middle-class clientele. This assumption receives considerable support from the analysis of the mammal bone from the features (Gust and Schulz, this volume).

Most of the fish assemblage seems in perfect accord with our expectations. Salmon, smelt, rockfish, seabass, and Sacramento perch were all highly esteemed fishes, while popular ratings of cod and lingcod are sufficiently equivocal that their presence evokes no particular surprise.

Sturgeon, in view of their rather questionable reputation in the last century, might be considered an unexpected inclusion. Their appearance (as "tenderloin of sole") on a menu of the Golden Eagle, however, suggests that market accounts of their popularity are overly negative or that diners disliked the flesh only when they knew what it was.

The surfperch, however, seem to have maintained a consistent position of low popular esteem. It appears that these fish were not favored by anyone (except perhaps the Chinese). Yet we have a report of one species (redtail surfperch) wholesaling for 15¢ per pound (San Francisco Call 31 March 1887:5)--two to three times the cost of most other species--an expression of popularity surely!

Even more interesting is the presence in the Feature 15 deposit of several thicketail chubs. These now-vanished minnows were usually accounted a poor table entree and often were viewed as a food only the Chinese would eat. The occurrence of several chubs in the present collection accordingly comes as a surprise. Whether their presence is evidence for an upward revision in our assessment of their status or for lowering our view of the status of the deposits can be determined only when results of the archaeological investigation are viewed as a whole.

## ACKNOWLEDGMENTS

This study was supported by the Sacramento Housing and Redevelopment Agency, through a contract with the Sonoma State University Academic Foundation. I wish to thank David Fredrickson and Adrian and Mary Praetzellis for allowing me to study the collection, and Kenneth A. Gobalet, Department of Zoology, University of California, Davis, for access to comparative specimens.

## REFERENCES

- Anonymous  
1978 Fishing in Tulare Lake. Los Tulares (Tulare County Historical Society Quarterly Bulletin) 118:3.
- Askin, Dorene  
1978 Representative menus from Nineteenth Century California Restaurants. Manuscript on file, Cultural Resources Management Unit, California Department of Parks and Recreation.
- Ayres, William O.  
1856 New Species of Californian Fishes. Boston Society of Natural History Proceedings 5:94-103.
- Babcock, John P.  
1894 Extracts from Reports. California State Board of Fish Commissioners Biennial Report, 1893-1894:42-49.
- Bryant, Edwin  
1936 What I Saw in California. Santa Ana: Fine Arts Press.
- Buckingham, R.H., A.B. Dibble, and T. J. Sherwood  
1886 Report. California State Commissioners of Fisheries Biennial Report 1885-1886:3-28.
- Cobb, John N.  
1927 Pacific Cod Fisheries. United States Commission of Fish and Fisheries Report of the Commissioner, 1925-1926:385-499.
- Collins, J.W.  
1892 Report on the Fisheries of the Pacific Coast of the United States. United States Commission of Fish and Fisheries, Report of the Commissioner, 1888:3-269.
- Croker, Richard S.  
1934 The Freshwater Commercial Fisheries of California. California Fish and Game 20(4):375-384.
- Cronise, Titus Fey  
1868 The Natural Wealth of California. San Francisco: H.H. Bancroft Company
- Derby, George H.  
1932 The Topographical Reports of Lieutenant George H. Derby. California Historical Society Quarterly 11(2):103-123.
- Dibble, A.B., R.H. Buckingham, and J.D. Redding  
1884 Report. California Commissioners of Fisheries Report, 1883-1884: 3-17.
- Eigenmann, Carl H.  
1890 The Food Fishes of the California Fresh Waters. California State Board of Fish Commissioners Biennial Report, 1888-1890: 53-65.

- Gibbs, George  
 1853 Journal of the Expedition of Colonel Redick McKee, United States Indian Agent, through Northwestern California. Pp. 99-177 in Historical and Statistical Information Respecting the History, Conditions and Prospects of the Indian Tribes of the United States. Vol. 3. H. R. Schoolcraft, ed. Washington: U. S. Government Printing Office.
- Girard, Charles  
 1857 Report on Fishes Collected on the Survey. Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean (Pt. 4, no. 1):9-34.
- Goode, G. Brown  
 1884 The Food Fishes of the United States. Pp. 163-686 in The Fisheries and Fishery Industries of the United States, Sect. 1, pt. 1. G. B. Goode, ed. Washington: U. S. Government Printing Office.
- Grunsky, Carl Ewald  
 1959 Stockton Boyhood. Berkeley: Friends of the Bancroft Library.
- Hittell, J.S.  
 1863 Resources of California. San Francisco: A. Roman and Co.
- Hubbs, Carl L., W. I. Follett, and L. J. Dempster  
 1979 List of the Fishes of California. California Academy of Sciences Occasional Papers, 133:1-51.
- Jordan, David Starr  
 1884a The Corvinas and Roncadors of the Pacific Coast. Pp. 378-380 in Fisheries and Fishery Industries of the United States. G. B. Goode, ed. Sect. 1, pt. 1. Washington; U. S. Government Printing Office.
- 1884b The Sun-fishes and their Allies. Pp. 404-407 in Fisheries and Fishery Industries of the United States. Sect. 2, pt. 6. G. B. Goode, ed. Washington: U.S. Government Printing Office.
- 1887 The Fisheries of the Pacific Coast. Pp. 589-624 in The Fisheries and Fishery Industries of the United States. Sect. 2, pt. 6. G.B. Goode, ed. Washington: U.S. Government Printing Office.
- 1892 The Fisheries of California. Overland Monthly 20(119):469-478.
- Jordan, David Starr, and C. H. Gilbert  
 1882 Notes on the Fishes of the Pacific Coast of the United States. United States National Museum, Proceedings 4:29-70.
- 1895 List of the Fishes Inhabiting Clear Lake, California. United States Fish Commission Bulletin 14:139-140.
- Kirkpatrick, C.A.  
 1860 Salmon Fishery on the Sacramento River. Hutchings' California Magazine 4(12):529-534.

- Lockington, W.N.
- 1879a Notes on Pacific Coast Fishes and Fisheries. American Naturalist 13(11):684-687.
  - 1879b Report upon the Food Fishes of San Francisco. California Commissioners of Fisheries Report, 1878-1879:17-58.
  - 1881 Report upon the Edible Fishes of the Pacific Coast, U.S.A. California Commissioners of Fisheries Report, 1880:16-66.
- Moyle, Peter B.
- 1976 Fish Introductions in California: History and Impact on Native Fishes. Biological Conservation 9:101-118.
- Redding, B.B., S.R. Throckmorton, and J.D. Farwell
- 1877 Report. California Commissioners of Fisheries Report, 1876-1877: 5-28.
- Schulz, Peter D.
- n.d. Nineteenth Century Fish Remains from Old Sacramento. Manuscript on file, Cultural Resource Management Unit, California Department of Parks and Recreation, Sacramento.
  - 1979 Fish Remains from a Historic Central California Indian Village. California Fish and Game 65(4):273-276.
- Schulz, Peter D., Hugh M. Wagner, and Daryl P. Domning
- 1976 Vertebrate Fauna of Site CA-Sac-329, Sacramento County, California. Pp. 129-141 in Archaeological Excavations at Sac-329 Near Walnut Grove, Sacramento County, California. W. E. Soule, ed. California State University Foundation, Sacramento.
- Schulz, Peter D., and Dwight D. Simons
- 1973 Fish Species Diversity in a Prehistoric Central California Indian Midden. California Fish and Game 59(2):107-113.
- Shebley, W.H.
- 1917 History of the Introduction of Food and Game Fishes into the Waters of California. California Fish and Game 3(1):3-12.
- Stone, Livingston
- 1874 On the Salmon-Fisheries of the Sacramento River. United States Commission of Fish and Fisheries, Report of the Commissioner, 1872-73:374-379.
  - 1876 Report of Operations in California in 1873: A-Clear Lake. United States Commission of Fish and Fisheries, Report of the Commissioner, 1873-1874 and 1874-1875:377-381.
- Tasto, Robert N.
- 1978 Spinal Column Deformity in a Pile Surfperch, *Damalichthys vacca*. California Fish and Game 64(3):223-225.

Wilcox, William A.

1895 The Fisheries of the Pacific Coast. United States Commission of Fish and Fisheries, Report of the Commissioner, 1893:143-304.

1898 Notes on the Fisheries of the Pacific Coast in 1895. United States Commission of Fish and Fisheries, Report of the Commissioner, 1896:575-659.

1902 The Fisheries of the Pacific Coast in 1899. United States Commission of Fish and Fisheries, Report of the Commissioner. 1901:510-573.

## APPENDIX 2.1

### Fish Remains Recovered from Soil Samples

#### Feature 6

##### Layer 27

*Archoplites interruptus*: ctenoid scale  
Unidentified: thoracic vertebra

#### Feature 15

##### Layer 53

*Archoplites interruptus*: L epihyal, 2 ctenoid scales  
Unidentified: 15 vertebrae, 2 dorsal spines, misc. fragments

##### Layer 59

Flatfish<sup>1</sup> (Pleuronectidae or Bothidae): 2 thoracic vertebrae  
*Gila crassicauda*: R premaxillary, R ceratohyal, first vertebra  
*Archoplites interruptus*: vomer, L ceratohyal, parasphenoid,  
supraoccipital, first vertebra, second vertebra, 9 thoracic  
vertebrae, 1 caudal vertebra, basioccipital  
Unidentified: 49 vertebrae, 11 dorsal spine, 12 ribs, misc. fragments

#### Feature 20

##### Layer 86

Unidentified: pterygiophore

#### Feature 8

##### Layer 84

*Scomber* sp. (mackerel)<sup>1</sup>: 2 thoracic vertebra  
*Onchorynchus tshawytscha*: thoracic vertebra  
*Archoplites interruptus*: R ceratohyal, R epihyal, 3 ctenoid scales  
*Atherinopsis californiensis*: L cleithrum  
Unidentified: 2 dorsal spines, 4 vertebrae

##### Layer 85

*Scomber* sp.: thoracic vertebra  
Unidentified (Cypuinae?): 3 vertebrae

---

<sup>1</sup>

Fish not recovered in major sample

APPENDIX 2.2

19th-Century Statements of Table or Market Value  
for Golden Eagle Fish Species

Date	Comments	Source
	Sacramento Perch	
1849	"Delicious eating."	Derby 1932:115
1852	The best food-fish in Clear Lake	Gibbs 1853:106
1854	"One of our most esteemed fishes."	Ayres 1856:99
1857	"Very much esteemed as an article of food."	Girard 1857:9
1862	"The only fish [In the river] considered worth keeping."	Grunsky 1959:59
1868	"About equal to the perch of other countries in flavor."	Cronise 1868:487
1872	"Perch, pile and sturgeon are the best food-fishes of the river."	Stone 1874:378
1873	"Their flesh is excellent, and they are highly prized as food both by white men and Indians."	Stone 1876:379
1879	"An important article of food not only to the white inhabitants of the district but also to the Chinese, who are particularly fond of it.... A very good fish for the table, unless taken in sloughs that, by the falling of the water, have become disconnected from the river."	Lockington 1897b:21
1880	"Bought and consumed mainly by the Chinese, who value it highly, paying for it more than for any other fish which they consume. Although it is an excellent pan fish...we have never seen any of them bought by Americans."	Jordan 1884b:405
1884	"The next best pan fish, and there is a difference of opinion as regards which is the better of the two, trout or perch."	<u>Sacramento Record - Union</u> 9 February 1884:5
1886	"Regarded by many as the best flavored and most palatable fish found in inland waters."	Buckingham et al. 1886:6
1887	"Fine in quality."	Anonymous 1978
1887	"Sell at 6 and 7 cents, and are favorites with many as a breakfast fish."	<u>San Francisco Call</u> 31 March 1887:5
1888	Sells at 4-8¢/lb.	Collins 1892:121
1890	"Not frequently brought into the market, and is of no great economic value."	Eigenmann 1890:64
1890	Retail value averages 10¢/lb.	Wilcox 1895:209
1891	Retail value averages 7¢/lb.	Wilcox 1895:209
1892	Retail value averages 8¢/lb.	Wilcox 1895:209
1892	Better food than catfish	Jordan 1892:476
1895	"An excellent food-fish."	Jordan and Gilbert 1895:140
1895	Wholesale (?) value averages 4.6¢/lb.	Wilcox 1898:633
1899	Wholesale (?) value in Sacramento 17¢/lb.	Wilcox 1902:555

Appendix 2.2, continued

Date	Comments	Source
Thicktail Chub		
1862	Not considered worth keeping by anglers. "Thrown back into the water."	Grunsky 1959:54
1863	"Not valuable."	Hittell 1863:146
1868	"None /native minnows/ are considered very good eating."	Cronise 1868:495
1884	"A great favorite with the Indian and Mongolian races."	Dibble et al. 1884:7
1884	"A very good pan fish."	<u>Sacramento Record-</u> <u>Union 9 February</u> 1884:5
1886	"An excellent fresh water fish, the flavor is almost equal to that of the Sacramento River perch. The chief objection to it is that it is quite bony, yet the meat peels well,"	Buckingham et al. 1886:7
1888	"One of the cheapest species, selling for from 1 to 3 cents per pound."	Collins 1892:123
White Seabass		
1863	"The meat is white and delicate, and always commands a high price."	Hittell 1863:144
1868	"One of the best sea-fish sold in our markets."	Cronise 1868:488
1879	"One of the most highly prized of the fishes of our markets, so much so that its name is given to the flesh of other species."	Lockington 1879a:685
1880	"One of the most valued food fishes of the coast."	Lockington 1881:45
1880	"Flesh is excellent, firm and well-flavored."	Jordan 1884a:379
1881	"Flesh is highly esteemed."	Jordan and Gilbert 1882:48
1888	"One of the most valued and important species on the coast." Sells for 1-10¢/lb.	Collins 1892:121
1890	Retail value averaged 7¢/lb.	Wilcox 1895:209
1891	Retail value averaged 5¢/lb.	Wilcox 1895:209
1892	Retail value averaged 7¢/lb.	Wilcox 1895:209
1895	Wholesale (?) value averaged 2.5¢/lb.	Wilcox 1898:633
Surfperch		
1863	"The meat is not good."	Hittell 1863:146
1869	"None of them are considered very good, though all are eaten, and command an extra price from the Chinese."	Cronise 1868:488
1880	"Far inferior to the other leading groups of food fishes."	Lockington 1881: 43
1881	"Flesh...flavorless and poor."	Jordan and Gilbert 1882:49

## Appendix 2.2, continued

Date	Comments	Source
1887	"One variety...known as the red tail sells at 15 cents a pound."	<u>San Francisco Call</u> 31 March 1887:5
1888	Most common species sells for 3-8¢/lb. "Mostly consumed by Chinese."	Collins 1892:120
1890	Retail value averaged 8¢/lb.	Wilcox 1895:209
1891	Retail value averaged 5¢/lb.	Wilcox 1895:209
1892	Retail value averaged 4¢/lb.	Wilcox 1895:209
1895	Wholesale (?) value averaged 2.4¢/lb.	Wilcox 1898:633
Jacksmelt		
1863	"The best of our small fishes."	Hittell 1863:145
1869	"Justly esteemed as food, but inferior to the true smelts."	Cronise 1868:488
1875	"Generally relished for food."	Jordan 1887:615
1881	"Flesh is firm, white, and delicate, but rather dry."	Jordan and Gilbert 1882:44
1887	Wholesaling at 7¢/lb.	<u>San Francisco Call</u> 31 March 1887:5
1888	Sells at 6-10¢/lb.	Collins 1892:122
1890	Retail value averaged 7¢/lb.	Wilcox 1895:209
1891	Retail value averaged 7¢/lb.	Wilcox 1895:209
1892	Retail value averaged 6¢/lb.	Wilcox 1895:209
1894	"An excellent food fish."	Babcock 1894:43
1895	Wholesale (?) value averaged 3¢/lb.	Wilcox 1898:633
Rockfish		
1854	"They bear always a high price."	Ayres 1856:94
1857	"All very much esteemed."	Girard 1857:15
1863	"The main supply of fish in the San Francisco market... They are always in market, and their meat is excellent in all seasons."	Hittell 1863:143
1868	"Favorite fish for the table...a resemblance to Cod in taste."	Cronise 1868:491
1880	Most species valued	Lockington 1881: 33-38
1883	Wholesale at 1½-7¢/lb., depending on supply.	<u>San Francisco Chronicle</u> 11 November 1883:1
1887	Wholesaling at 7¢/lb. "People who like rock-cod like it excessively; to most people it requires careful cooking and a good deal of sauce to make it palatable."	<u>San Francisco Call</u> 31 March 1887:5
1888	Sells at 4-10¢/lb.	Collins 1892:120
1890	Retail value averaged 8¢/lb.	Wilcox 1895:209
1891	Retail value averaged 7¢/lb.	Wilcox 1895:209
1892	Retail value averaged 5¢/lb.	Wilcox 1895:209
1895	Wholesale (?) value, fresh 2¢/lb.; salted 3.4¢/lb.	Wilcox 1898:633

## Appendix 2.2, continued

Date	Comments	Source
White and Green Sturgeon		
1863	"The meat...is coarse, and in the market is worth only about one-fourth or one-sixth that of better table fishes..."	Hittell 1863:143
1872	"Perch, pike and sturgeon are the best food-fishes" of the river.	Stone 1874:378
1875	"Unwittingly confounded with sea-bass by restaurant keepers, as many people can testify."	Jordan 1887:615
1879	Flesh disguised under names "sea basse" and "tenderloin of sole".	Lockington 1879a: 685
1879	"'Sea Bass', boiled and baked, is a constant dish at the restaurants of the city /San Francisco/, but examination shows that much of that sold at the cheaper restaurants is sturgeon." Only white sturgeon "brought to market in abundance, as the fishermen have a prejudice against the ...green sturgeon...asserting that it is poisonous."	Lockington 1879b: 26, 51
1880	White "very cheap." Green "not used as a food, being reputed poisonous."	Goode 1884:663
1880	White "very cheap." Green "not eaten as it has the reputation of being poisonous; green color of the flesh prevents its sale as 'sea bass.' The flesh in reality is as good as that of the white sturgeon."	Lockington 1881: 58
1881	White "largely used as food, although very cheap. In the restaurants it is usually called 'sea-bass'." Green "not used as food being reputed 'poisonous' by the fishermen."	Jordan and Gilbert 1882:36
1884	"One of our best and cheapest food fishes, and is becoming more in favor with all classes of our citizens."	Dibble et al. 1884:8
1884	White "in the early days was considered of no value as a food fish;" now "one of the best of our cheap fish, and is used in great quantities."	Sacramento Record Union 9 February 1884:5
1886	"One of the best and cheapest food fishes... A favored food with all classes of our citizens, and well advertised in 'bills of fare' as the 'steak of sole'."	Buckingham et al. 1886:5
1888	White "abundant and meets with a good demand at all seasons, selling at from 4 to 12½ cents per pound." Green "not in favor as a food fish."	Collins 1892:124
1890	White "sold in restaurants as 'tenderloin of sole'." Green no longer thought poisonous, "still looked upon with less favor than the white,"	Eigenmann 1890:55
1890	Retail value averaged 5¢/lb.	Wilcox 1895:209
1891	Retail value averaged 5¢/lb.	Wilcox 1895:209
1892	Retail value averaged 4½¢/lb.	Wilcox 1895:209
1895	Wholesale (?) value averaged 2.8¢/lb.	Wilcox 1898:633

Appendix 2.2, continued

Date	Comments	Source
Lingcod		
1880	"As a food fish it ranks high."	Lockington 1881:33
1881	"One of the better food fishes."	Jordan and Gilbert 1882:54
1890	Retail value averaged 7¢/lb.	Wilcox 1895:209
1891	Retail value averaged 6¢/lb.	Wilcox 1895:209
1892	Retail value averaged 5¢/lb.	Wilcox 1895:209
1892	"Not a first-class fish." Young sold as "white bait" (young herring).	Babcock 1894:43
1895	Wholesale (?) value averaged 3¢/lb.	Wilcox 1898:633