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MASTER

SALTON SEA SAMPLING PROGRAM:
BASELINE STUDIES

R. E. Tullis

J. L. Carter

G. W. Lanlois

California State University, Hayward

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 Lawrence
Livermore
Laboratory

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Submitted by:

Dr. Richard E. Tullis, Project Director,

James L. Carter and Gregg W. Langlois

**Department of Biological Science
California State University, Hayward
Hayward, Cal. 94542**

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Environmental Sciences Division

Dr. Joseph H. Shinn/Robert R. Ireland

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INTRODUCTION

This report provides baseline data on three species of fish from the Salton Sea, California. The fishes considered were the orange mouth corvina (Cynoscion xanthulus), gulf croaker (Bairdiella icistius) and sargo (Anisotremus davidsonii). Morphometric and meristic data are presented as a baseline to aid in the evaluation of any physiological stress the fish may experience as a result of geothermal development. Analyses were made on muscle, liver, and bone of the fishes sampled to provide baseline data on elemental tissue burdens. The elements measured were: As, Br, Ca, Cu, Fe, Ga, K, Mn, Ni, Pb, Rb, Se, Sr, Zn, and Zr. These data are important if an environmentally sound progression of geothermal power production is to occur at the Salton Sea.

MATERIALS AND METHODS

The fishes studied were collected from four different locations in the Salton Sea. The most northern station was 50 m off shore of Salton Sea State Park (SP). The next southern station was 100 m off the inflow of Salt Creek (SC). Our southern most station was between Red Hill Marina (RH) and Obsidian Butte. The distance from shore was approximately 1 km. In addition we sampled one deep water (11 m) station located 5 km SSW off Bombay Marina (BB).

Fish were collected on four sampling trips of approximately one week duration each. These were initiated on: December 19, 1977; April 3, 1978; July 10, 1978; and October 1, 1978.

Fish were collected with 125 ft. sinking gillnets graded from 2-in. to 5-in. stretch. The procedure for the collection and handling of gillnetted fish was as follows: gillnets at SP, SC, and RH were set in shallow water

(-2 to 4 m); gillnets at BB were set on the bottom at 11 m; the nets were set in the evening and retrieved the next morning; the set time ranged from 12-18 h.

After retrieval, fish were removed from the nets and morphometric and meristic data were recorded. If more fish were collected than needed, fish were selected to provide a representative size range of the catch. The fish were then individually placed in separate polyethylene bags and frozen on dry ice for transport to California State University, Hayward.

Acid washed plastic utensils were used to excise portions of the muscle, liver, and bone. The tissue samples were placed in acid washed beakers and weighed, then dried at 60°C for at least 48 h, cooled in a desiccator and weighed a second time. The samples were then taken from less than 200°C to 450°C in increments of 50°C/h in a muffle furnace. They remained in the muffle furnace until all organic material was ashed. For some samples (liver) it was necessary to pool the tissue from several fish to provide adequate material for analysis.

Upon completion of the ashing process each sample was transferred to an acid washed glass vial and sent to Lawrence Livermore National Laboratory for elemental analysis by x-ray fluorescence.

RESULTS AND DISCUSSION:

1. Morphometrics and Meristics

Dorsal fin ray counts were made to determine if there were any deviations from normal counts (Tables 1-4). Few abnormal dorsal fin ray counts were observed for the corvina or gulf croaker. Data from the first year's sampling indicated that abnormal fin ray counts existed in the sargo. To test if there was a significant difference in the sargo fin ray numbers, we counted fin rays from specimens in the collection at the California Academy of Sciences (CAS). The sargo in the CAS collection are from two different locations, coastal California and the Gulf of California.

Miller and Lea¹ report the range in dorsal soft rays of sargo to be 14-16. The sargo from the CAS collection had a range of 14-16 ($\bar{x}=15.59$, $S^2=0.4186$, $n=34$). The sargo from the Salton Sea had a range of 11-16 ($\bar{x}=14.02$, $S^2=0.9524$, $n=63$). The calculated t value (9.06, d.f. =95) was larger than the critical t value (1.988, $p < .05$) indicating a significant difference in the mean number of dorsal soft rays between these two populations.

Variations in the number of intraspecific meristic characters has been attributed to a number of physical parameters. These include temperature^{2,3,4,5}, salinity⁶, and light^{7,8}. In addition it has been recognized that variation in meristics may also be a function of productivity⁹.

The Salton Sea is physically different from the ocean waters of coastal southern California and the Gulf of California. Temperatures range from 13°C to over 35°C¹⁰. Hubbs² and Weisel⁵ both observed negative correlations

between temperature and the number of dorsal fin rays in populations studied in the field. The salinity of the Salton Sea in 1977 was 37-38 $^{\circ}/oo$. Heuts⁶, studying fresh water and sea water populations of Gasterosteus aculeatus, found differences in the population means of dorsal fin spine and ray counts. Taning³ suggested that the role of salinity may be obscured by the relative impermeability of the vitelline membrane. Another, though indirect, result of salinity is the buoyancy of the sargo eggs. Lasker, Tenza and Chamberlain¹¹ found that the eggs of sargo sank in sea water but floated in Salton Sea water. This would imply that the eggs are exposed to more light in the Salton Sea than in the ocean environment. Lindsey⁸ found decreasing vertebrae and anal fin ray counts in Oncorhynchus nerka with increased light. The Salton Sea is an extremely eutrophic environment. Johnson and Barnett,⁹ studying midwater fishes from different parts at the Pacific Ocean, showed highly negative correlations between productivity and meristic number.

Gonado-somatic indices were calculated for corvina, gulf croaker, and sargo (Figures 1a, b, & c). Corvina gonad weight increased in April to a maximum in July. The large range in the gonado-somatic index of corvina indicate that spawning is not strongly synchronized¹². In addition we observed several individuals that appeared to be reabsorbing the gonadal tissue. The sargo gonado-somatic indices reached a maximum in April, indicating late spring as the reproductive period. Gulf croaker gonado-somatic indices reached a maximum in April, indicating late spring as the reproductive period. Gulf croaker gonado-somatic indices showed temporal characteristics similar to sargo.

Liver indices are represented in Figures 2a,b and c. Liver indices were lowest in October for gulf croaker and sargo and lowest in July-October for corvina. These periods represent post-spawning times for all species. In addition the later periods may represent post summer temperature stress.

Macroscopic examination of stomach contents were made on corvina, gulf croaker, and sargo (Table 5). Corvina fed on fish most of the year with their diet consisting of mollies (Poecilia latapinna), gulf croaker, and sargo. In April 92% of the corvina with food present in their stomachs contained Neanthes succinea. This may indicate a shift in the diet due to the disappearance of gulf croaker and sargo during spawning. Sargo fed on barnacles (Balanus amphitrite) most of the year but switched exclusively to N. succinea in April. The gulf croaker fed almost exclusively on worms (N. succinea). However, 57% of its stomach contents in July consisted of juvenile sargo, supporting the estimate of late spring as the spawning period of sargo.

Major and Trace Elements

Mean levels of the major and trace elements detected in muscle, liver, and bone for the three species tested are listed in Table 6. Most concentrations are within the ranges reported by other researchers. There appear to be higher values in some of the major elements, ie. Ca, Sr, and K.

Patterson and Settle¹³ found Ca concentrations in tuna muscle, liver, and bone to be 78 ppm, 444 ppm, and 157,746 ppm respectively (values adjusted to dry weight). Concentrations in Salton Sea fishes were higher in all tissues except corvina liver. Sargo had the highest Ca values of all Salton Sea fishes. The diet of sargo consists predominately of the barnacle Balanus amphitrite. The stomachs of sargo are frequently full of barnacle remains.

Strontium follows a similar pattern of being much higher in muscle and liver of Salton Sea fishes, though bone concentrations are lower then reported for tuna¹³.

We found K values in muscle ($x = 21,936 \text{ ppm}$) to be higher than the concentrations Young¹⁴ found in Salton Sea fish ($x = 14,480 \text{ ppm}$, value adjusted to dry weight). His values were similar to those found by Patterson and Settle¹³ in tuna.

Rubidium values in our samples were also higher then the values found by Patterson and Settle¹³ in tuna and Young¹⁴ in Salton Sea fish.

Arsenic concentrations in Salton Sea fish muscle were within the range reported by Heit¹⁵ for striped bass. These values are low compared to values found in shorthorn sculpins by Bohn and Fallis¹⁶.

Copper values are conspicuous in that they are much lower in all tissues than those found by Cross et. al.¹⁷ in bluefish and Bohn and Fallis¹⁶.

Zinc concentrations are the same or lower than those found by other researchers^{15,16,17}.

Lead values are higher than those reported by Patterson and Settle¹³ but lower than found by Heit¹⁵. One should be careful in interpreting Pb analyses because of the difficulty in obtaining uncontaminated samples¹⁸.

In general the frequency of highest concentration for an element per tissue is sargo > gulf croaker > corvina. Patrick and Loutit¹⁹ found that fish fed metal contaminated tubificid worms had higher metal body burdens than those fed un-contaminated worms. In addition it was shown that the body burden of fish fed metal contaminated worms increased with time. Table 5 shows that corvina fed predominately on fish while the gulf croaker and sargo fed mainly on the worm, Neanthes succinea, and the barnacle, Balanus amphitrite, respectively.

Tables 7, 8, and 9 present mean element concentrations per tissue per station for corvina, gulf croaker, and sargo. There appears to be no obvious spacial variation in elemental concentrations. Young¹⁴ also found the Salton Sea to be relatively homogeneous.

Tables 10 through 18 present elemental concentrations of the sampled tissues relative to sampling period. There appears to be no temporal variation in elemental concentrations.

Summary:

1. There appeared to be no significant variations in observed meristic characters for corvina or gulf croaker.
2. Sargo showed reduced dorsal soft ray frequencies that were significantly ($p < .05$) lower than fish analyzed from other locations.
3. Major elements were generally higher in concentration than reported by other researchers.
4. In general, most trace elements were within the same concentration range, or lower, when compared to other studies on fish.

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Table 1. Morphometric and meristic data for first sampling period (12-19-77).

| Fish species | Location | Fish No. | Body Wt. g | Std Length cm | Go-So Index | Liver Index | Fin-Ray Count |
|---|----------|----------|------------|---------------|-------------|-------------|---------------|
| <u>Cynosion xanthulus</u> | SSSP | A | 603.5 | 33.0 | - | 0.027 | DX+I, 20 |
| | SSSP | B | 621.3 | 33.5 | - | 0.031 | DIX+I, 20 |
| | SSSP | C | 687.8 | 34.5 | - | 0.029 | DIX+I, 21 |
| | SSSP | D | 730.4 | 34.5 | - | 0.032 | DVIII+I, 20 |
| | SSSP | E | 785.7 | 35.0 | - | 0.042 | DIX+I, 20 |
| | S-SSSP | F | 844.7 | 35.5 | 0.001 | 0.038 | DIX+I, 20 |
| | S-SSSP | G | 906.5 | 38.0 | 0.001 | 0.024 | DIX+I, 22 |
| | S-SSSP | H | 1142.9 | 41.0 | 0.003 | 0.021 | DIX+I, 20 |
| | S-SSSP | I | 1202.5 | 44.5 | 0.007 | 0.014 | DIX+I, 21 |
| | S-SSSP | J | 1315.2 | 44.5 | 0.001 | 0.017 | DIX+I, 20 |
| | S-SSSP | K | 1422.7 | 45.0 | 0.001 | 0.022 | DIX+I, 20 |
| | S-SSSP | L | 1469.7 | 45.5 | 0.001 | 0.018 | DIX+I, 20 |
| | S-SSSP | M | 1515.0 | 47.0 | 0.001 | 0.013 | DIX+I, 20 |
| | SC | N | 1738.6 | 40.5 | 0.001 | 0.012 | DVIII+I, 22 |
| | S-SSSP | P | 1879.0 | 49.5 | 0.001 | 0.017 | DIX+I, 20 |
| | S-SSSP | Q | 1973.2 | 50.5 | 0.001 | 0.017 | DIX+I, 20 |
| <u>Anisotremus</u> <u>davidsonii</u> | SSSP | A | 296.6 | 20.5 | 0.014 | 0.021 | DXI, 13 |
| | SSSP | B | 289.8 | 21.0 | 0.003 | 0.011 | DXI, 14 |
| | SC | C | 247.1 | 19.5 | 0.010 | 0.011 | DXI, 12 |
| <u>Bairdiella</u> <u>icistius</u> | SSSP | A | 106.6 | 17.0 | 0.013 | 0.016 | DX, 28 |
| | SSSP | B | 108.3 | 17.0 | .005 | .012 | DXI, 26 |
| | SSSP | C | 189.6 | 21.0 | .003 | .019 | DX, 28 |
| | SSSP | D | 221.1 | 22.0 | .012 | .018 | DXI, 29 |
| | SSSP | E | 231.1 | 22.0 | .011 | .020 | DXI, 28 |
| | SSSP | F | 232.8 | 21.0 | .014 | .017 | DXI, 27 |
| | SSSP | G | 252.0 | 22.5 | .014 | .019 | DXII, 28 |
| | SSSP | H | 317.3 | 24.5 | .013 | .018 | DXI, 28 |
| | | I | 105.4 | 16.5 | .005 | .018 | DXI, 27 |
| | | J | 115.2 | 17.5 | .008 | .018 | DXI, 28 |
| | | K | 138.1 | 18.0 | .011 | .012 | DXI, 27 |
| | | L | 210.0 | 21.0 | .002 | .012 | DXI, 25 |
| | | M | 246.3 | 22.0 | .005 | .025 | DXI, 28 |
| | | N | 249.1 | 22.5 | .013 | .019 | DXI, 23 |
| | | P | 274.9 | 23.5 | .017 | .023 | DXI, 25 |
| | | Q | 344.1 | 23.5 | .014 | .013 | DXI, 25 |

Table 2. Morphometric and meristic data for second sampling period (4-3-78).

| Fish species | Location | Fish No. | Body Wt. g | Std Length cm | Go-So Index | Liver Index | Fin-Ray Count |
|---|----------|----------|------------|---------------|-------------|-------------|---------------|
| <u>Cynosion xanthulus</u> | | SSSP | A 1032.5 | 42.0 | 0.004 | .037 | IX+I, 19 |
| | | SSSP | B 1430.8 | 46.0 | 0.019 | .020 | IX+I, 20 |
| | | SSSP | C 1871.9 | 50.0 | .011 | .015 | IX+I, 21 |
| | | SSSP | D 2326.8 | 52.0 | .010 | .014 | IX+I, 20 |
| | | SSSP | E 3690.0 | 66.5 | .003 | .001 | IX+I, 18 |
| | | SC | F 752.1 | 35.5 | .002 | .027 | IX+I, 21 |
| | | SC | G 788.2 | 26.0 | .003 | .032 | IX+I, 19 |
| | | SC | H 987.3 | 39.0 | .003 | .041 | IX+I, 22 |
| | | SC | I 1609.2 | 47.0 | .012 | .019 | IX+I, 22 |
| | | SC | J 1701.2 | 48.0 | .012 | .015 | IX+I, 21 |
| | | SC | K 2823.0 | 50.0 | .023 | .011 | IX+I, 20 |
| | | RHM | L 1120.7 | 40.0 | .004 | .036 | IX+I, 20 |
| | | RHM | M 1272.1 | 42.5 | .012 | .014 | IX+I, 21 |
| | | RHM | N 1411.2 | 43.0 | .012 | .024 | IX+I, 20 |
| | | RHM | P 1578.8 | 47.0 | .013 | .024 | IX+I, 20 |
| | | RHM | Q 1914.2 | 51.0 | .009 | .017 | IX+I, 9 |
| <u>Anisotremus</u> <u>davidsonii</u> | | SSSP | A 100.2 | 14.0 | .057 | .015 | DXII, 12 |
| | | SSSP | B 76.3 | 12.5 | .088 | .006 | DXII, 13 |
| | | SSSP | C 75.0 | 13.5 | .056 | .005 | DXII, 13 |
| | | SSSP | D 319.3 | 20.5 | .089 | .019 | DXII, 13 |
| | | SSSP | E 390.0 | 21.5 | .085 | .028 | DXII, 12 |
| <u>Bairdiella</u> <u>icistius</u> | | SSSP | A 140.9 | 17.5 | - | .006 | XI, 29 |
| | | SSSP | B 209.1 | 21.0 | .068 | .024 | XI, 26 |
| | | SSSP | C 316.0 | 23.5 | .069 | .029 | XI, 25 |
| | | SSSP | D 431.9 | 25.5 | .085 | .027 | XI, 27 |
| | | SC | E 98.6 | 16.0 | .055 | .010 | XI, 24 |
| | | SC | F 253.9 | 22.0 | .083 | .028 | XI, 30 |
| | | SC | G 384.0 | 25.5 | .094 | .041 | XI, 26 |
| | | SC | H 443.0 | 26.5 | .099 | .026 | XI, 27 |
| | | BBAY | I 37.2 | 11.2 | - | .010 | XI, 25 |
| | | BBAY | J 204.8 | 20.5 | .067 | .020 | XI, 27 |
| | | BBAY | K 344.5 | 24.0 | .088 | .025 | XI, 26 |
| | | BBAY | L 442.2 | 26.0 | .079 | .030 | XI, 25 |
| | | RHM | M 99.8 | 16.0 | - | .013 | XI, 25 |
| | | RHM | N 160.3 | 18.0 | .051 | .018 | XI, 26 |
| | | RHM | P 243.9 | 21.0 | .061 | .022 | XI, 28 |
| | | RHM | Q 423.0 | 25.5 | .079 | .047 | XII, 26 |

Table 3. Morphometric and meristic data for third sampling period (7-10-78).

| Fish species | Location | Fish No. | Body Wt. g | Std Length cm | Go-So Index | Liver Index | Fin-Ray Count |
|----------------------------------|----------|----------|------------|---------------|-------------|-------------|---------------|
| <u><i>Cynosion xanthulus</i></u> | | SSSP | A 1609.0 | 47.5 | .041 | .019 | IX+I, 21 |
| | | SSSP | B 2184.0 | 51.5 | .024 | .021 | IX+I, 21 |
| | | RHM | C 166.0 | 20.5 | .002 | .015 | IX+I, 19 |
| | | RHM | D 214.0 | 22.0 | .004 | .011 | IX+I, 20 |
| | | RHM | E 252.0 | 22.5 | .004 | .006 | IX+I, 20 |
| | | SC | F 955.0 | 39.0 | .027 | .023 | IX+I, 20 |
| | | SC | G 1550.0 | 46.5 | .039 | .013 | IX+I, 20 |
| | | SC | H 1633.0 | 49.0 | .030 | .015 | VIII+I, 21 |
| | | SC | I 1640.0 | 45.0 | .109 | .022 | IX+I, 21 |
| | | SC | J 2002.0 | 50.5 | .026 | .023 | IX+I, 20 |
| | | SC | K 2078.0 | 50.0 | .033 | .020 | IX+I, 19 |
| | | RHM | L 5100.0 | 70.0 | .054 | .011 | IX+I, 21 |
| <u><i>Anisotremus</i></u> | | | | | | | |
| <u><i>davidsonii</i></u> | | SSSP | A 432.0 | 22.5 | .013 | .016 | XI, 12 |
| <u><i>Bairdiella</i></u> | | | | | | | |
| <u><i>icistius</i></u> | | SSSP | A 69.0 | 15.0 | .003 | .003 | X, 25 |
| | | SSSP | B 125.0 | 17.0 | .005 | .006 | X, 25 |
| | | SSSP | C 194.0 | 20.5 | .023 | .007 | X, 27 |
| | | SSSP | D 271.0 | 22.0 | .030 | .017 | X, 29 |
| | | SSSP | E 394.0 | 26.0 | .053 | .016 | X, 26 |
| | | RHM | F 81.0 | 15.0 | - | .001 | X, 27 |
| | | RHM | G 213.0 | 19.0 | .023 | .005 | XI, 26 |
| | | RHM | H 230.0 | 20.0 | .008 | .008 | X, 28 |
| | | RHM | I 289.0 | 21.0 | .012 | .008 | XI, 27 |
| | | RHM | J 415.0 | 25.0 | .036 | .013 | XI, 28 |
| | | SC | K 79.0 | 14.5 | .002 | .009 | XI, 26 |
| | | SC | L 93.0 | 15.5 | .006 | .007 | XI, 26 |
| | | SC | M 161.0 | 19.0 | .008 | .003 | XI, 27 |
| | | SC | N 252.0 | 22.0 | .044 | .004 | XI, 25 |
| | | SC | P 352.0 | 24.5 | .031 | .013 | X, 28 |

Table 4. Morphometric and meristic data for fourth sampling period (10-1-78).

| Fish species | Location | Fish No. | Body Wt. g | Std Length cm | Go-So Index | Liver Index | Fin-Ray Count |
|---|----------|----------|------------|---------------|-------------|-------------|---------------|
| <u><i>Cynosion xanthulus</i></u> | | SC | A 501 | 31.5 | .001 | .017 | IX+I, 19 |
| | | SC | B 600 | 33.5 | .001 | .010 | IX+I, 19 |
| | | SC | C 785 | 35.0 | .004 | .020 | IX+I, 20 |
| | | SC | D 2700 | 56.0 | .006 | .010 | VIII+I, 20 |
| | | SC | E 5700 | 75.0 | .010 | .009 | IX+I, 20 |
| | | SSSP | F 436 | 30.5 | .003 | .017 | IX+I, 20 |
| | | SSSP | G 604 | 32.0 | .001 | .019 | IX+I, 20 |
| | | SSSP | H 724 | 33.5 | - | .014 | IX+I, 21 |
| | | SSSP | I 1402 | 40.5 | - | .013 | IX+I, 21 |
| | | SSSP | J 1776 | 49.5 | .004 | .013 | IX+I, 18 |
| | | SSSP | K 2450 | 56.5 | .011 | .016 | IX+I, 20 |
| | | RHM | L 338 | 26.5 | .007 | .031 | IX+I, 18 |
| | | RHM | M 372 | 27.5 | .010 | .025 | IX+I, 20 |
| | | RHM | N 508 | 31.0 | .011 | .017 | IX+I, 20 |
| | | RHM | P 517 | 31.0 | .014 | .016 | IX+I, 21 |
| | | RHM | Q 536 | 32.5 | .010 | .020 | IX+I, 20 |
| <u><i>Anisotremus</i></u> <u><i>davidsonii</i></u> | | SC | A 160 | 17.0 | .027 | .021 | XI, 13 |
| | | SSSP | B 294 | 21.0 | .015 | .013 | X, 14 |
| | | SSSP | C 354 | 23.5 | .002 | .011 | XII, 14 |
| | | SSSP | D 394 | 21.5 | .003 | .012 | XII, 13 |
| | | RHM | E 111 | 15.0 | .011 | .013 | XII, 13 |
| | | RHM | F 282 | 21.0 | .007 | .009 | XI, 14 |
| | | RHM | G 292 | 20.9 | .005 | .017 | XI, 14 |
| | | RHM | H 350 | 22.5 | .018 | .006 | XI, 14 |
| | | RHM | I 401 | 23.0 | .017 | .011 | XI, 14 |
| | | RHM | J 472 | 24.5 | .004 | .017 | XI, 13 |
| <u><i>Bairdiella</i></u> <u><i>icistius</i></u> | | SC | A 110 | 18.0 | .001 | .011 | XI, 28 |
| | | SC | B 230 | 22.5 | .002 | .001 | X, 29 |
| | | SC | C 246 | 23.5 | .012 | .006 | XI, 28 |
| | | SC | D 262 | 23.5 | .012 | .006 | XI, 27 |
| | | SC | E 318 | 25.0 | .014 | .008 | XII, 26 |
| | | SC | F 416 | 27.0 | .016 | .006 | XI, 26 |
| | | SSSP | G 112.5 | 18.5 | - | .006 | XI, 27 |
| | | SSSP | H 166 | 20.5 | .011 | .005 | XI, 24 |
| | | SSSP | I 221 | 22.5 | .004 | .009 | XI, 29 |
| | | RHM | J 180 | 19.5 | .012 | .006 | X, 27 |
| | | RHM | K 188 | 20.0 | .001 | .009 | XI, 26 |
| | | RHM | L 193 | 19.5 | .001 | .004 | X, 29 |
| | | RHM | M 274 | 23.5 | .010 | .006 | XI, 26 |
| | | RHM | N 284 | 24.0 | .010 | .004 | XI, 26 |
| | | RHM | P 301 | 25.5 | .014 | .008 | XI, 27 |
| | | RHM | Q 309 | 24.0 | .010 | .006 | XI, 25 |

Table 5. Percent frequency of food items in stomach of corvina, gulf croaker, and sargo.

| Fish species | Sample date | Total # of fish sampled | (n) food in stomach | Percent of food type in stomachs with food | | |
|--------------|-------------|-------------------------|---------------------|--|--------------------|-------------------|
| | | | | (n) w/o stomach | Balanus amphitrite | Neanthes succinea |
| Corvina | DEC | 16 | 12 | 93 | - | 7 |
| | APR | 16 | 19 | 8 | - | 92 |
| | JUL | 12 | 8 | 100 | - | - |
| | OCT | 16 | 37 | 100 | - | - |
| Gulf croaker | DEC | 16 | 6 | - | - | 100 |
| | APR | 16 | 19 | - | - | 100 |
| | JUL | 15 | 66 | 57 | 29 | 14 |
| | OCT | 16 | 94 | - | - | 100 |
| Sargo | DEC | 3 | 33 | - | 100 | - |
| | APR | 5 | 60 | - | - | 100 |
| | JUL | 1 | 100 | - | - | - |
| | OCT | 10 | 30 | - | 100 | - |

Table 6. Mean concentration of elements, in muscle, liver, and bone of corvina, gulf croaker, and sargo.

| CORVINA | | | GULF CROAKER | | | SARGO | | | |
|--------------|--------|------------|--------------|--------|------------|-----------|--------|------------|-----------|
| Muscle | n | mean | Std. Dev. | n | mean | Std. Dev. | n | mean | Std. Dev. |
| AS | 59,000 | 0.390 | 0.146 | 63,000 | 0.572 | 0.241 | 17,000 | 0.648 | 0.192 |
| BR | 59,000 | 2.613 | 1.113 | 63,000 | 3.087 | 1.005 | 17,000 | 3.918 | 1.576 |
| CA | 59,000 | 254.933 | 197.491 | 63,000 | 585.170 | 319.582 | 17,000 | 2693.781 | 7228.680 |
| CH | 59,000 | 0.435 | 0.216 | 63,000 | 0.603 | 0.247 | 17,000 | 0.639 | 0.261 |
| FE | 59,000 | 13.219 | 7.644 | 63,000 | 18.311 | 6.574 | 17,000 | 17.705 | 3.674 |
| FISHWEIGHT | 60,000 | 1406.012 | 1036.851 | 63,000 | 231.802 | 104.574 | 19,000 | 280.858 | 122.976 |
| GA | 11,000 | 0.101 | 0.028 | 19,000 | 0.094 | 0.027 | 5,000 | 0.097 | 0.014 |
| K | 59,000 | 22692.237 | 4011.819 | 63,000 | 21903.958 | 3938.390 | 17,000 | 19436.176 | 5816.478 |
| MN | 18,000 | 0.302 | 0.083 | 1,000 | 0.000 | | 1,000 | 3.132 | |
| PB | 11,000 | 0.396 | 0.525 | 15,000 | 0.316 | 0.156 | 3,000 | 0.229 | 0.020 |
| RB | 59,000 | 6.207 | 1.934 | 6,000 | 0.176 | 0.129 | 1,000 | 0.155 | |
| SE | 57,000 | 0.136 | 0.009 | 63,000 | 5.281 | 1.136 | 17,000 | 5.662 | 1.806 |
| SR | 59,000 | 1.780 | 1.136 | 63,000 | 0.180 | 0.118 | 17,000 | 0.145 | 0.111 |
| WEIGHT:D/A | 50,000 | 19.554 | 5.768 | 63,000 | 4.775 | 2.418 | 17,000 | 11.978 | 22.817 |
| ZN | 1,000 | 12.670 | 2.764 | 61,000 | 18.068 | 1.929 | 19,000 | 17.709 | 2.098 |
| ZR | 1,000 | 0.069 | | 63,000 | 16.148 | 2.774 | 17,000 | 14.814 | 3.325 |
| | | | | 2,000 | -0.243 | 0.197 | 1,000 | 0.233 | |
| Liver | | | | | | | | | |
| AS | 49,000 | 0.268 | 0.141 | 11,000 | 0.718 | 0.551 | 6,000 | 0.773 | 0.388 |
| BR | 47,000 | 2.340 | 2.272 | 10,000 | 5.809 | 5.009 | 9,000 | 2.244 | 1.171 |
| CA | 19,000 | 261.403 | 218.889 | 11,000 | 1111.521 | 1280.325 | 6,000 | 6284.458 | 14212.613 |
| CU | 49,000 | 11.884 | 11.570 | 11,000 | 4.520 | 2.363 | 6,000 | 1.991 | 1.488 |
| FE | 49,000 | 354.340 | 301.390 | 11,000 | 978.691 | 1078.596 | 6,000 | 365.995 | 287.933 |
| FISHWEIGHT | 60,000 | 1406.012 | 1036.851 | 63,000 | 231.802 | 104.574 | 19,000 | 280.858 | 122.976 |
| GA | 28,000 | 0.108 | 0.066 | 6,000 | 0.125 | 0.030 | 3,000 | 0.112 | 0.065 |
| K | 49,000 | 5574.776 | 2990.533 | 11,000 | 9364.182 | 2486.480 | 6,000 | 4677.667 | 2490.588 |
| MN | 49,000 | 1.792 | 1.522 | 11,000 | 3.583 | 2.094 | 6,000 | 3.250 | 3.178 |
| NI | 1,000 | 0.234 | | 2,000 | 0.323 | 0.135 | 1,000 | 0.350 | |
| PB | 18,000 | 0.222 | 0.243 | 2,000 | 0.136 | 0.014 | 1,000 | 0.128 | |
| RB | 49,000 | 1.501 | 0.962 | 11,000 | 2.642 | 0.630 | 6,000 | 1.327 | 0.946 |
| SE | 43,000 | 0.038 | 0.041 | 10,000 | 0.104 | 0.122 | 6,000 | 0.211 | 0.245 |
| SR | 49,000 | 3.315 | 2.780 | 11,000 | 12.987 | 12.081 | 6,000 | 23.359 | 42.788 |
| WEIGHT | 66,000 | 26.179 | 14.766 | 75,000 | 6.266 | 8.071 | 23,000 | 5.775 | 5.109 |
| WEIGHT:D/A | 50,000 | 59.561 | 31.316 | 12,000 | 23.255 | 7.572 | 6,000 | 34.513 | 15.600 |
| ZN | 49,000 | 64.585 | 45.105 | 11,000 | 46.986 | 10.026 | 6,000 | 40.400 | 33.811 |
| ZR | 9,000 | 0.055 | 0.054 | 5,000 | 0.291 | 0.218 | 4,000 | 0.396 | 0.517 |
| | | | | | | | | | |
| Bone | | | | | | | | | |
| AS | 59,000 | 1.308 | 0.250 | 62,000 | 2.645 | 0.461 | 19,000 | 3.025 | 1.519 |
| BR | 60,000 | 3.484 | 0.749 | 62,000 | 2.455 | 0.583 | 18,000 | 4.162 | 5.001 |
| CA | 60,000 | 158993.333 | 17483.279 | 62,000 | 150308.548 | 27160.774 | 19,000 | 165647.313 | 62177.727 |
| CU | 7,000 | 0.981 | 0.116 | 22,000 | 13.130 | 55.944 | 9,000 | 3.793 | 5.406 |
| FE | 60,000 | 34.697 | 13.262 | 62,000 | 101.338 | 52.774 | 19,000 | 276.215 | 316.212 |
| FISHWEIGHT | 60,000 | 1406.012 | 1036.851 | 63,000 | 231.802 | 104.574 | 19,000 | 280.858 | 122.976 |
| GA | 50,000 | 0.629 | 0.156 | 53,000 | 0.731 | 0.196 | 16,000 | 0.818 | 0.214 |
| K | 60,000 | 5473.417 | 2559.945 | 62,000 | 13370.016 | 3092.051 | 19,000 | 23406.368 | 34133.499 |
| MN | 60,000 | 19.460 | 5.924 | 62,000 | 12.316 | 3.702 | 18,000 | 24.377 | 5.798 |
| NI | 12,000 | 1.353 | 0.218 | 20,000 | 1.747 | 0.518 | 7,000 | 1.953 | 0.380 |
| PB | 3,000 | 12.265 | 17.317 | 1,000 | 1.004 | | 19,000 | 4.618 | 7.770 |
| RB | 60,000 | 1.002 | 0.645 | 62,000 | 2.050 | 0.622 | 19,000 | 1.446 | 0.422 |
| SE | 60,000 | 1.051 | 0.334 | 62,000 | 2.368 | 0.889 | 19,000 | 580.567 | 235.589 |
| SR | 60,000 | 413.315 | 27.674 | 62,000 | 572.544 | 119.774 | 19,000 | 2.916 | 0.318 |
| WEIGHT:D/A | 60,000 | 3.573 | 0.381 | 63,000 | 3.240 | 0.368 | 19,000 | 65.633 | 107.377 |
| ZN | 60,000 | 33.376 | 5.856 | 62,000 | 42.778 | 19.312 | 6,000 | 2.306 | 2.410 |
| ZP | 60,000 | 2.043 | 1.711 | 13,000 | 4.346 | 2.073 | | | |

Table 7. Mean concentration of elements in corvina muscle, liver, and bone relative to station sampled.

| SP | MUSCLE | | | LIVER | | | BONE | | |
|------------|--------|-----------|-----------|--------|----------|-----------|--------|------------|-----------|
| | n | mean | Std. Dev. | n | mean | Std. Dev. | n | mean | Std. Dev. |
| AS | 28,000 | 0.325 | 0.146 | 24,000 | 0.227 | 0.111 | 28,000 | 1.219 | 0.234 |
| BR | 28,000 | 2.431 | 1.363 | 22,000 | 2.034 | 2.235 | 28,000 | 3.632 | 0.473 |
| CA | 28,000 | 305.979 | 215.245 | 24,000 | 217.365 | 172.536 | 28,000 | 154060.714 | 15466.203 |
| CU | 28,000 | 0.497 | 0.233 | 24,000 | 6.983 | 5.470 | 28,000 | 0.636 | 0.012 |
| FE | 28,000 | 13.987 | 10.274 | 24,000 | 268.693 | 192.123 | 28,000 | 31.274 | 11.144 |
| FISHWEIGHT | 28,000 | 1379.896 | 724.878 | 28,000 | 1379.896 | 724.878 | 28,000 | 1379.896 | 724.878 |
| GA | 6,000 | 0.090 | 0.033 | 9,000 | 0.073 | 0.039 | 25,000 | 0.635 | 0.151 |
| K | 28,000 | 22309.286 | 3963.807 | 24,000 | 4866.251 | 2903.974 | 28,000 | 4014.500 | 1360.427 |
| NI | 7,000 | 0.319 | 0.120 | 24,000 | 1.575 | 1.601 | 28,000 | 18.451 | 3.255 |
| PB | 13,000 | 0.419 | 0.538 | 11,000 | 0.317 | 0.270 | 1,000 | 2.178 | |
| RB | 28,000 | 5.647 | 1.710 | 24,000 | 1.248 | 0.883 | 28,000 | 0.775 | 0.393 |
| SE | 27,000 | 0.130 | 0.094 | 22,000 | 0.044 | 0.055 | 28,000 | 1.028 | 0.213 |
| SR | 28,000 | 1.861 | 1.440 | 24,000 | 2.743 | 2.374 | 28,000 | 420.554 | 92.090 |
| WEIGHT:D/A | 28,000 | 19.307 | 3.256 | 20,000 | 28.532 | 14.223 | 28,000 | 3.661 | 0.414 |
| ZN | 26,000 | 12.687 | 2.974 | 25,000 | 68.010 | 31.214 | 28,000 | 31.126 | 3.530 |
| ZR | 1,000 | 0.089 | | 24,000 | 46.717 | 31.930 | 16,000 | 2.637 | 1.680 |
| SC | | | | 7,000 | 0.030 | 0.014 | | | |
| AS | 18,000 | 0.458 | 0.128 | 17,000 | 0.313 | 0.153 | 18,000 | 1.344 | 0.245 |
| BR | 18,000 | 2.712 | 0.610 | 17,000 | 2.684 | 2.640 | 19,000 | 3.525 | 1.073 |
| CA | 18,000 | 230.970 | 106.850 | 17,000 | 298.400 | 255.154 | 19,000 | 166321.053 | 21493.554 |
| CU | 18,000 | 0.409 | 0.102 | 17,000 | 19.129 | 14.716 | 19,000 | 1.050 | 0.101 |
| FE | 18,000 | 14.809 | 4.703 | 17,000 | 522.129 | 396.809 | 19,000 | 34.939 | 11.526 |
| FISHWEIGHT | 19,000 | 1875.979 | 1409.981 | 19,000 | 1875.979 | 1409.981 | 19,000 | 1875.979 | 1409.981 |
| GA | 4,000 | 0.118 | 0.010 | 14,000 | 0.140 | 0.072 | 13,000 | 0.693 | 0.192 |
| K | 18,000 | 23990.000 | 2841.180 | 17,000 | 6635.000 | 3284.139 | 19,000 | 5011.526 | 2546.337 |
| NI | 8,000 | 0.288 | 0.050 | 17,000 | 2.302 | 1.611 | 19,000 | 18.997 | 4.783 |
| PB | 1,000 | 0.089 | | 1,000 | 0.294 | | 6,000 | 1.402 | 0.292 |
| RB | 18,000 | 6.719 | 1.478 | 4,000 | 0.084 | 0.075 | 2,000 | 17.308 | 21.145 |
| SE | 16,000 | 0.156 | 0.093 | 17,000 | 1.843 | 1.058 | 19,000 | 0.938 | 0.531 |
| SR | 18,000 | 1.660 | 0.685 | 14,000 | 0.035 | 0.017 | 19,000 | 0.954 | 0.196 |
| WEIGHT:D/A | 19,000 | 18.223 | 1.320 | 17,000 | 4.032 | 3.297 | 19,000 | 457.521 | 104.343 |
| ZN | 18,000 | 13.007 | 1.046 | 20,000 | 30.049 | 13.921 | 19,000 | 3.440 | 0.386 |
| ZR | | | | 17,000 | 46.539 | 27.969 | 19,000 | 32.566 | 5.052 |
| | | | | 17,000 | 95.268 | 52.607 | 16,000 | 3.468 | 1.641 |
| | | | | 1,000 | 0.171 | | | | |
| RH | | | | | | | | | |
| AS | 13,000 | 0.438 | 0.115 | 8,000 | 0.293 | 0.176 | 13,000 | 1.385 | 0.280 |
| BR | 13,000 | 2.856 | 1.052 | 8,000 | 2.260 | 1.414 | 13,000 | 3.107 | 0.554 |
| CA | 13,000 | 350.980 | 233.261 | 8,000 | 314.890 | 261.935 | 13,000 | 156931.231 | 11953.757 |
| CU | 13,000 | 0.726 | 0.143 | 8,000 | 11.192 | 8.664 | 1,000 | 0.959 | |
| FE | 13,000 | 9.498 | 2.901 | 8,000 | 254.775 | 191.941 | 13,000 | 41.713 | 17.471 |
| FISHWEIGHT | 13,000 | 764.615 | 593.122 | 13,000 | 764.615 | 593.122 | 13,000 | 784.615 | 593.122 |
| GA | 1,000 | 0.098 | | 5,000 | 0.080 | 0.041 | 12,000 | 0.547 | 0.078 |
| K | 13,000 | 21720.154 | 5200.880 | 8,000 | 5344.750 | 2089.129 | 13,000 | 7996.462 | 3030.031 |
| NI | 1,000 | 0.286 | | 8,000 | 1.360 | 0.728 | 13,000 | 22.311 | 10.141 |
| RB | 13,000 | 6.702 | 2.648 | 3,000 | 0.057 | 0.046 | 6,000 | 1.304 | 0.117 |
| SE | 12,000 | 0.120 | 0.071 | 8,000 | 1.533 | 0.851 | 13,000 | 1.553 | 0.879 |
| SR | 13,000 | 1.816 | 0.934 | 7,000 | 0.028 | 0.020 | 13,000 | 1.243 | 0.577 |
| WEIGHT:D/A | 13,000 | 22.215 | 11.289 | 8,000 | 3.510 | 2.699 | 13,000 | 360.946 | 73.459 |
| ZN | 13,000 | 13.074 | 3.914 | 16,000 | 16.926 | 13.620 | 13,000 | 3.576 | 0.240 |
| ZR | | | | 8,000 | 60.831 | 32.673 | 13,000 | 28.922 | 7.872 |
| | | | | 1,000 | 0.116 | 27.132 | 7,000 | 2.065 | 1.167 |

Table 8. Mean concentration of elements in gulf croaker muscle, liver, and bone relative to station sampled.

| SP | MUSCLE | | | LIVER | | | BONE | | |
|------------|--------|-----------|-----------|--------|-----------|-----------|--------|------------|-----------|
| | n | mean | Std. Dev. | n | mean | Std. Dev. | n | mean | Std. Dev. |
| AS | 20,000 | 0.575 | 0.250 | 4,000 | 0.924 | 0.792 | 20,000 | 2.651 | 0.492 |
| BR | 20,000 | 3.142 | 0.691 | 4,000 | 5.080 | 2.620 | 20,000 | 2.387 | 0.723 |
| CA | 20,000 | 585.535 | 200.973 | 4,000 | 1832.150 | 1832.75 | 20,000 | 150935.000 | 19824.846 |
| CU | 20,000 | 0.662 | 0.250 | 4,000 | 6.210 | 2.678 | 20,000 | 33.901 | 92.810 |
| FE | 20,000 | 17.961 | 6.003 | 4,000 | 795.225 | 592.108 | 20,000 | 118.127 | 71.225 |
| FISHWEIGHT | 20,000 | 215.460 | 96.511 | 20,000 | 215.460 | 96.511 | 20,000 | 215.460 | 96.511 |
| GA | 4,000 | 0.096 | 0.010 | 1,000 | 0.174 | 0.100 | 18,000 | 0.671 | 0.189 |
| K | 20,000 | 22036.000 | 2613.242 | 4,000 | 10274.000 | 1868.529 | 20,000 | 13682.500 | 2575.301 |
| NI | 3,000 | 0.356 | 0.232 | 4,000 | 3.401 | 1.574 | 20,000 | 11.421 | 3.551 |
| PB | 4,000 | 0.168 | 0.165 | 1,000 | 0.227 | 0.227 | 6,000 | 1.036 | 0.735 |
| RB | 20,000 | 5.312 | 1.046 | 4,000 | 2.942 | 0.439 | 1,000 | 1.004 | |
| SE | 20,000 | 0.162 | 0.117 | 3,000 | 0.076 | 0.041 | 20,000 | 1.990 | 0.535 |
| SR | 20,000 | 4.106 | 1.687 | 4,000 | 18.899 | 16.756 | 20,000 | 2.421 | 1.032 |
| WEIGHT:D/A | 20,000 | 15.050 | 1.506 | 24,000 | 6.102 | 7.644 | 20,000 | 563.515 | 108.919 |
| ZN | 20,000 | 1.311 | 1.640 | 4,000 | 20.955 | 5.342 | 20,000 | 3.250 | 0.326 |
| | | | | 4,000 | 53.085 | 6.830 | 20,000 | 48.624 | 33.134 |
| | | | | 2,000 | 0.464 | 0.240 | 15,000 | 3.516 | 1.134 |
| SC | | | | | | | | | |
| AS | 23,000 | 0.543 | 0.214 | 4,000 | 0.642 | 0.432 | 23,000 | 2.650 | 0.373 |
| BR | 23,000 | 2.142 | 0.623 | 3,000 | 7.889 | 7.927 | 23,000 | 2.494 | 0.464 |
| CA | 23,000 | 585.535 | 295.623 | 4,000 | 777.050 | 910.141 | 23,000 | 154050.870 | 29774.372 |
| CU | 23,000 | 0.546 | 0.232 | 4,000 | 5.031 | 2.006 | 9,000 | 1.276 | 0.233 |
| FE | 23,000 | 17.742 | 5.974 | 4,000 | 1096.800 | 1484.053 | 23,000 | 85.987 | 26.819 |
| FISHWEIGHT | 23,000 | 233.983 | 108.605 | 23,000 | 233.983 | 108.605 | 23,000 | 233.983 | 108.605 |
| GA | 7,000 | 0.066 | 0.043 | 3,000 | 0.108 | 0.095 | 23,000 | 0.108 | 0.095 |
| MM | 23,000 | 22103.217 | 5246.879 | 4,000 | 8119.000 | 3351.093 | 23,000 | 12747.130 | 3065.895 |
| NI | 1,000 | 0.000 | 0.000 | 4,000 | 3.212 | 3.133 | 23,000 | 12.892 | 3.732 |
| RB | 23,000 | 5.268 | 1.463 | 1,000 | 0.146 | 0.146 | 23,000 | 2.060 | 0.772 |
| SE | 23,000 | 0.175 | 0.099 | 4,000 | 2.403 | 0.838 | 23,000 | 2.449 | 0.862 |
| SR | 23,000 | 5.290 | 2.771 | 4,000 | 1.821 | 0.664 | 23,000 | 578.978 | 133.637 |
| WEIGHT:D/A | 23,000 | 17.780 | 1.384 | 27,000 | 10.624 | 10.614 | 23,000 | 1.248 | 0.468 |
| ZN | 23,000 | 15.963 | 4.055 | 6,240 | 8.556 | 8.556 | 23,000 | 40.323 | 4.465 |
| ZR | 1,000 | 0.104 | 0.221 | 4,000 | 24.437 | 10.632 | 15,000 | 4.564 | 2.394 |
| | | | | 4,000 | 44.532 | 11.960 | | | |
| | | | | 1,000 | 0.241 | | | | |
| BB | | | | | | | | | |
| AS | 4,000 | 0.604 | 0.524 | | | | | | |
| BR | 4,000 | 3.745 | 0.833 | | | | | | |
| CA | 4,000 | 434.975 | 189.593 | | | | | | |
| CU | 4,000 | 0.855 | 0.431 | | | | | | |
| FE | 4,000 | 26.932 | 12.858 | | | | | | |
| FISHWEIGHT | 4,000 | 257.175 | 176.081 | | | | | | |
| K | 4,000 | 22015.070 | 5246.539 | | | | | | |
| RB | 4,000 | 4.000 | 0.091 | | | | | | |
| SE | 4,000 | 0.026 | 2.365 | | | | | | |
| WEIGHT:D/A | 4,000 | 17.272 | 1.995 | | | | | | |
| ZN | 4,000 | 15.707 | 0.786 | | | | | | |
| ZR | 1,000 | 0.302 | | | | | | | |
| RU | | | | | | | | | |
| AS | 16,000 | 0.553 | 0.161 | 2,000 | 0.684 | 0.441 | 15,000 | 2.732 | 0.520 |
| BR | 16,000 | 3.294 | 1.241 | 2,000 | 3.956 | 6.622 | 15,000 | 2.623 | 0.553 |
| CA | 16,000 | 619.634 | 412.902 | 2,000 | 753.900 | 628.052 | 15,000 | 151483.933 | 23775.871 |
| CU | 16,000 | 0.517 | 0.130 | 2,000 | 3.594 | 1.627 | 15,000 | 0.890 | 0.042 |
| FE | 16,000 | 17.409 | 5.118 | 2,000 | 1432.700 | 1718.694 | 15,000 | 67.807 | 23.332 |
| FISHWEIGHT | 16,000 | 242.750 | 96.130 | 16,000 | 242.750 | 96.130 | 16,000 | 242.750 | 96.130 |
| GA | 8,000 | 0.100 | 0.012 | 1,000 | 0.200 | 0.197 | 14,000 | 0.785 | 0.197 |
| K | 15,000 | 21164.325 | 3753.935 | 2,000 | 10812.000 | 1821.507 | 15,000 | 13823.600 | 3803.266 |
| NI | 7,000 | 0.279 | 0.058 | 2,000 | 5.042 | 1.237 | 15,000 | 12.520 | 4.075 |
| RD | 2,000 | 0.132 | 0.009 | 1,000 | 0.126 | 0.126 | 5,000 | 1.626 | 0.407 |
| RB | 16,000 | 5.363 | 0.839 | 2,000 | 2.821 | 0.521 | 15,000 | 2.115 | 0.500 |
| SE | 16,000 | 0.235 | 0.139 | 2,000 | 0.000 | 0.018 | 15,000 | 2.502 | 0.725 |
| SR | 16,000 | 4.808 | 2.677 | 2,000 | 10.184 | 8.966 | 15,000 | 578.527 | 97.720 |
| WEIGHT:D/A | 16,000 | 16.704 | 1.971 | 19,000 | 5.348 | 7.604 | 16,000 | 3.159 | 0.353 |
| ZH | 16,000 | 16,000 | | 3,000 | 22.260 | 7.768 | 15,000 | 39.920 | 5.264 |
| | | | | 2,000 | 45.730 | 10.720 | | | |
| | | | | 1,000 | 0.128 | | | | |

Table 9. Mean concentration of elements in surgo muscle, liver, and bone relative to station sampled.

| MUSCLE | | | | LIVER | | | | BONE | | | | |
|--------|------------|--------|-----------|----------|------------|--------|----------|-----------|------------|--------|------------|-----------|
| SP | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| | AS | 10,000 | 0.584 | 0.181 | AS | 4,000 | 0.828 | 0.210 | AS | 11,000 | 3.304 | 1.983 |
| | BR | 10,000 | 3.797 | 1.797 | BR | 4,000 | 2.141 | 1.325 | BR | 10,000 | 5.129 | 6.681 |
| | CA | 10,000 | 4089.540 | 9344.093 | CA | 4,000 | 9361.375 | 17285.735 | CA | 11,000 | 149181.727 | 77004.462 |
| | CU | 10,000 | 0.650 | 0.329 | CU | 4,000 | 2.368 | 1.651 | CU | 8,000 | 4.089 | 5.701 |
| | FE | 10,000 | 17.319 | 2.601 | FE | 4,000 | 459.442 | 310.764 | FE | 11,000 | 313.185 | 383.984 |
| | FISHWEIGHT | 11,000 | 274.655 | 130.869 | FISHWEIGHT | 11,000 | 274.655 | 130.869 | FISHWEIGHT | 11,000 | 274.655 | 130.869 |
| | GA | 4,000 | 0.096 | 0.015 | GA | 2,000 | 0.146 | 0.039 | GA | 8,000 | 0.786 | 0.167 |
| | K | 10,000 | 17160.500 | 6110.517 | K | 4,000 | 5655.250 | 2254.753 | K | 10,000 | 29844.636 | 44547.617 |
| | MN | 1,000 | 3.132 | | MN | 4,000 | 4.459 | 3.284 | MN | 10,000 | 22.650 | 4.966 |
| | NI | 2,000 | 0.238 | 0.023 | NI | 1,000 | 0.350 | | NI | 5,000 | 1.975 | 0.289 |
| | PB | 1,000 | 0.155 | | PB | 1,000 | 0.128 | | RB | 11,000 | 6.239 | 10.082 |
| | RB | 10,000 | 5.033 | 2.047 | RB | 4,000 | 1.598 | 1.017 | SE | 11,000 | 1.357 | 0.497 |
| | SE | 10,000 | 0.165 | 0.139 | SE | 4,000 | 0.293 | 0.270 | SR | 11,000 | 521.979 | 290.269 |
| | SR | 10,000 | 17.178 | 29.069 | SR | 4,000 | 34.112 | 50.862 | WEIGHT:D/A | 11,000 | 2.949 | 0.365 |
| | WEIGHT:D/A | 11,000 | 17.057 | 2.610 | WEIGHT | 14,000 | 5.930 | 4.566 | ZN | 11,000 | 108.708 | 139.100 |
| | ZN | 10,000 | 14.393 | 3.872 | WEIGHT:D/A | 4,000 | 27.900 | 11.801 | ZR | 5,000 | 2.559 | 2.603 |
| | | 1,000 | 0.633 | | ZN | 4,000 | 50.035 | 38.574 | | | | |
| | | | | | ZR | 3,000 | 0.517 | 0.559 | | | | |
| SC | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| | AS | 2,000 | 0.602 | 0.110 | AS | 1,000 | 0.123 | | AS | 2,000 | 2.695 | 0.115 |
| | BR | 2,000 | 2.654 | 1.055 | CA | 1,000 | 27.450 | | BR | 2,000 | 2.901 | 0.528 |
| | CA | 2,000 | 1625.000 | 571.926 | CU | 1,000 | 0.469 | | CA | 2,000 | 184900.000 | 311.270 |
| | CU | 2,000 | 0.709 | 0.132 | FE | 1,000 | 76.600 | | FE | 2,000 | 105.125 | 16.652 |
| | FE | 2,000 | 13.371 | 4.905 | FISHWEIGHT | 2,000 | 203.550 | 61.589 | FISHWEIGHT | 2,000 | 203.550 | 61.539 |
| | FISHWEIGHT | 2,000 | 203.550 | 61.589 | K | 1,000 | 1257.000 | | GA | 2,000 | 0.699 | 0.018 |
| | RB | 2,000 | 25880.000 | 4299.200 | MN | 1,000 | 0.289 | | K | 2,000 | 14020.000 | 4157.798 |
| | SE | 2,000 | 6.878 | 1.633 | RB | 1,000 | 0.291 | | MN | 2,000 | 33.245 | 0.471 |
| | SR | 2,000 | 0.121 | 0.078 | SE | 1,000 | 0.013 | | RB | 2,000 | 2.222 | 0.602 |
| | WEIGHT:D/A | 2,000 | 8.405 | 4.434 | SR | 1,000 | 0.223 | | SE | 2,000 | 1.846 | 0.459 |
| | ZN | 2,000 | 16.010 | 0.636 | WEIGHT | 2,000 | 2.553 | 0.090 | SR | 2,000 | 584.400 | 26.304 |
| | | 2,000 | 15.415 | 3.924 | WEIGHT:D/A | 1,000 | 36.030 | | WEIGHT:D/A | 2,000 | 2.843 | 0.128 |
| | | | | | ZN | 1,000 | 12.820 | | ZN | 2,000 | 54.285 | 2.284 |
| | | | | | ZR | 1,000 | 0.031 | | | | | |

RH

SEE OTHER

SEE OTHER

SEE OTHER

Table 10. Mean concentration of elements in corvina muscle relative to sampling period and station.
December April July October

| PARAMETER | N | December | | April | | July | | October | |
|------------|--------|-----------|----------|--------|-----------|----------|---------|-----------|----------|
| | | A-MEAN | STD DEV | A-MEAN | STD DEV | A-MEAN | STD DEV | A-MEAN | STD DEV |
| SP | | | | | | | | | |
| AS | 15,000 | 0.256 | 0.132 | 5,000 | 0.339 | 0.083 | 2,000 | 0.455 | 0.120 |
| BR | 15,000 | 1.619 | 0.637 | 5,000 | 4.257 | 1.884 | 2,000 | 3.033 | 0.646 |
| CA | 15,000 | 332.246 | 269.311 | 5,000 | 264.520 | 172.917 | 2,000 | 246.950 | 164.261 |
| CU | 15,000 | 0.218 | 0.079 | 5,000 | 0.549 | 0.079 | 2,000 | 0.391 | 0.068 |
| FE | 15,000 | 10.665 | 3.718 | 5,000 | 14.733 | 9.135 | 2,000 | 9.262 | 0.242 |
| FISHWEIGHT | 15,000 | 1140.007 | 447.261 | 5,000 | 2070.400 | 1026.471 | 2,000 | 1896.500 | 406.586 |
| GA | 3,000 | 0.070 | 0.023 | 5,000 | 26164.000 | 5322.451 | 2,000 | 23775.000 | 3698.168 |
| K | 15,000 | 20370.667 | 3035.246 | 2,000 | 0.309 | 0.042 | 2,000 | 6.581 | 0.808 |
| PB | 10,000 | 0.499 | 0.596 | 2,000 | 0.136 | 0.044 | 2,000 | 0.174 | 0.064 |
| PR | 15,000 | 4.680 | 0.948 | 5,000 | 5.120 | 1.136 | 2,000 | 2.007 | 1.103 |
| SE | 14,000 | 0.084 | 0.061 | 5,000 | 0.266 | 0.108 | 2,000 | 18.010 | 2.531 |
| SP | 15,000 | 1.814 | 1.711 | 5,000 | 2.116 | 0.715 | 2,000 | 13.450 | 0.594 |
| WEIGHT:D/A | 15,000 | 20.470 | 3.603 | 5,000 | 17.428 | 3.455 | 1,000 | 0.089 | |
| ZN | 15,000 | 11.417 | 1.939 | 5,000 | 14.101 | 3.620 | | | |
| SC | | | | | | | | | |
| AS | .199 | | | N | A-MEAN | STD DEV | N | A-MEAN | STD DEV |
| BR | 2.316 | | | 5,000 | 0.458 | 0.087 | 7,000 | 0.464 | 0.139 |
| CA | 238.3 | | | 5,000 | 2.455 | 0.685 | 7,000 | 2.922 | 0.660 |
| CU | 302 | | | 5,000 | 20.380 | 63.522 | 7,000 | 218.057 | 105.711 |
| FE | 17.51 | | | 5,000 | 0.429 | 0.115 | 7,000 | 0.453 | 0.087 |
| FW | 1738.6 | | | 5,000 | 1443.500 | 788.981 | 7,000 | 2136.857 | 1356.699 |
| K | 22390. | | | 1,000 | 0.109 | | 1,000 | 0.112 | |
| RB | 5.033 | | | 5,000 | 23610.000 | 1437.220 | 7,000 | 25315.714 | 2071.166 |
| SE | .178 | | | 2,000 | 0.240 | 0.004 | 3,000 | 0.304 | 0.074 |
| SR | 1.371 | | | 1,000 | 0.089 | | 7,000 | 7.552 | 0.809 |
| WT | 19.470 | | | 5,000 | 4.844 | 0.463 | 7,000 | 0.147 | 0.097 |
| ZN | 12.280 | | | 5,000 | 0.213 | 0.107 | 7,000 | 1.695 | 0.749 |
| RH | | | | | | | | | |
| PARAMETER | N | A-MEAN | STD DEV | N | A-MEAN | STD DEV | N | A-MEAN | STD DEV |
| AS | 5,000 | 0.428 | 0.147 | 3,000 | 0.458 | 0.084 | 5,000 | 0.437 | 0.126 |
| BR | 5,000 | 2.172 | 0.963 | 5,000 | 4.106 | 1.005 | 5,000 | 2.615 | 0.361 |
| CA | 5,000 | 161.163 | 111.856 | 3,000 | 649.233 | 221.509 | 5,000 | 387.840 | 141.696 |
| CU | 5,000 | 0.300 | 0.153 | 3,000 | 0.261 | 0.075 | 5,000 | 0.495 | 0.085 |
| FE | 5,000 | 7.729 | 2.432 | 3,000 | 8.574 | 1.646 | 5,000 | 11.820 | 2.518 |
| FISHWEIGHT | 5,000 | 1459.400 | 305.459 | 3,000 | 210.667 | 43.097 | 5,000 | 454.200 | 91.909 |
| K | 5,000 | 17968.400 | 6419.717 | 3,000 | 21916.667 | 2322.592 | 1,000 | 0.088 | |
| RB | 5,000 | 0.140 | 0.246 | 3,000 | 8.988 | 0.647 | 5,000 | 25354.000 | 1815.277 |
| SE | 5,000 | 0.146 | 0.071 | 2,000 | 0.061 | 0.018 | 1,000 | 0.286 | |
| SR | 3,000 | 1.262 | 0.617 | 3,000 | 2.011 | 1.019 | 5,000 | 8.253 | 1.294 |
| WEIGHT:D/A | 5,000 | 29.606 | 16.430 | 3,000 | 16.600 | 0.980 | 5,000 | 0.109 | 0.042 |
| ZN | 5,000 | 9.613 | 4.279 | 3,000 | 16.393 | 0.476 | 5,000 | 1.772 | 0.767 |
| | | | | | | | 5,000 | 18.074 | 0.463 |
| | | | | | | | 5,000 | 14.544 | 1.233 |

Table 11. Mean concentration of elements in corvina liver relative to sampling period and station.

Table 12. -Mean concentration of elements in corvina bone relative to sampling period and station.

| PARAMETER | N | December | | April | | July | | October | | | | | |
|-----------|------------|----------|------------|------------|-----------|------------|------------|-----------|------------|------------|-----------|------------|-----------|
| | | A-MEAN | STD DEV | A-MEAN | STD DEV | A-MEAN | STD DEV | A-MEAN | STD DEV | | | | |
| SP | AS | 15.000 | 1.245 | 0.219 | 5.000 | 1.162 | 0.353 | 2.000 | 1.434 | 0.139 | 6.000 | 1.252 | 0.196 |
| | BR | 15.000 | 3.690 | 0.403 | 5.000 | 4.013 | 0.319 | 2.000 | 3.095 | 0.579 | 6.000 | 3.061 | 0.264 |
| | CA | 15.000 | 150973.333 | 18847.867 | 5.000 | 158620.000 | 9354.785 | 2.000 | 159150.000 | 9404.520 | 6.000 | 160483.333 | 10390.268 |
| | CU | 1.000 | 0.847 | 0.047 | 5.000 | 39.600 | 6.256 | 2.000 | 43.720 | 13.308 | 1.000 | 0.864 | 0.047 |
| | FE | 15.000 | 24.965 | 7.522 | 5.000 | 2070.400 | 1026.471 | 2.000 | 1896.500 | 406.536 | 6.000 | 35.956 | 12.980 |
| | FISHWEIGHT | 15.000 | 1140.007 | 447.261 | 5.000 | 618.000 | 0.160 | 1.000 | 0.500 | 0.000 | 6.000 | 1232.000 | 786.692 |
| | GA | 15.000 | 0.598 | 0.154 | 5.000 | 3691.600 | 1320.514 | 2.000 | 4237.500 | 1218.345 | 6.000 | 0.736 | 0.125 |
| | K | 15.000 | 4379.133 | 1150.759 | 5.000 | 16.686 | 1.042 | 2.000 | 23.200 | 1.669 | 6.000 | 6097.667 | 937.984 |
| | MN | 15.000 | 13.273 | 3.201 | 5.000 | 0.494 | 0.193 | 2.000 | 0.834 | 0.099 | 6.000 | 18.783 | 3.380 |
| | RB | 1.000 | 21.178 | 0.000 | 5.000 | 0.842 | 0.065 | 2.000 | 0.976 | 0.006 | 6.000 | 1.414 | 0.311 |
| RB | RB | 15.000 | 0.605 | 0.157 | 5.000 | 492.380 | 144.157 | 2.000 | 408.650 | 9.122 | 6.000 | 0.928 | 0.156 |
| | SE | 15.000 | 1.136 | 0.218 | 5.000 | 3.302 | 0.541 | 2.000 | 3.444 | 0.240 | 6.000 | 324.600 | 60.060 |
| | SR | 15.000 | 397.807 | 78.377 | 5.000 | 20.300 | 3.364 | 2.000 | 31.990 | 2.107 | 6.000 | 3.485 | 0.154 |
| | WEIGHT:D/A | 15.000 | 3.834 | 0.393 | 5.000 | 3.816 | 0.202 | 2.000 | 3.199 | 1.971 | 6.000 | 34.293 | 1.862 |
| | ZN | 15.000 | 30.323 | 3.753 | 5.000 | 0.000 | 0.000 | 2.000 | 0.000 | 0.000 | 5.000 | 4.366 | 0.725 |
| | ZR | 6.000 | 0.933 | 0.168 | 5.000 | 0.000 | 0.000 | 2.000 | 0.000 | 0.000 | 5.000 | 0.000 | 0.000 |
| SC | AS | 1.152 | 5.000 | 1.250 | 0.160 | 7.000 | 1.496 | 0.270 | 5.000 | 1.262 | 0.226 | | |
| | BR | 3.910 | 6.000 | 3.363 | 0.582 | 7.000 | 3.423 | 1.257 | 5.000 | 3.783 | 1.487 | | |
| | CA | 152200. | 6.000 | 154016.667 | 12644.907 | 7.000 | 173357.143 | 24912.772 | 5.000 | 171260.000 | 22309.482 | | |
| | FE | 21.77 | 1.000 | 0.973 | 8.595 | 7.000 | 36.967 | 11.313 | 3.000 | 1.074 | 0.107 | | |
| | FW | 1738.6 | 6.000 | 1443.500 | 788.981 | 7.000 | 0.707 | 0.189 | 5.000 | 2057.200 | 2227.491 | | |
| | K | 2959. | 1.000 | 0.493 | 7.000 | 5065.714 | 3366.090 | 5.000 | 0.712 | 0.215 | | | |
| | MN | 21.03 | 6.000 | 4462.667 | 1663.262 | 7.000 | 19.826 | 6.010 | 5.000 | 6004.800 | 2443.915 | | |
| | RB | 4.410 | 3.000 | 17.953 | 4.777 | 1.000 | 1.879 | 0.000 | 5.000 | 18.682 | 4.032 | | |
| | SE | 1.25 | 2.000 | 17.308 | 21.145 | 7.000 | 0.989 | 0.215 | 5.000 | 1.297 | 0.403 | | |
| | SR | 446.5 | 6.000 | 0.624 | 0.222 | 7.000 | 528.529 | 78.740 | 5.000 | 1.044 | 0.075 | | |
| RH | WT | 3.785 | 6.000 | 0.709 | 0.136 | 7.000 | 3.243 | 0.372 | 5.000 | 432.700 | 147.871 | | |
| | ZN | 27.74 | 6.000 | 397.000 | 49.257 | 7.000 | 35.560 | 4.027 | 5.000 | 3.278 | 0.358 | | |
| | AS | 6.000 | 3.747 | 0.226 | 7.000 | 3.095 | 1.296 | 5.000 | 35.294 | 3.563 | | | |
| | BR | 6.000 | 28.530 | 4.183 | 5.000 | 2.315 | 1.131 | 5.000 | 4.912 | 2.248 | | | |
| | CA | 6.000 | 1459.400 | 305.459 | 5.000 | 0.000 | 0.000 | 5.000 | 0.000 | 0.000 | | | |
| | FE | 6.000 | 31.532 | 9.086 | 1.000 | 0.959 | 0.179 | 5.000 | 1.616 | 0.267 | | | |
| | FISHWEIGHT | 6.000 | 1459.400 | 305.459 | 3.000 | 66.237 | 15.962 | 5.000 | 3.073 | 0.223 | | | |
| | GA | 6.000 | 0.542 | 0.081 | 3.000 | 210.667 | 43.097 | 4.000 | 0.603 | 0.036 | | | |
| | K | 6.000 | 4708.600 | 1354.708 | 3.000 | 0.479 | 0.026 | 5.000 | 9117.400 | 1001.372 | | | |
| | MIN | 6.000 | 12.710 | 3.910 | 3.000 | 11616.667 | 825.611 | 5.000 | 26.540 | 5.406 | | | |
| SR | NI | 6.000 | 1.286 | 0.098 | 3.000 | 31.267 | 10.514 | 3.000 | 1.323 | 0.154 | | | |
| | RD | 6.000 | 0.672 | 0.261 | 3.000 | 2.713 | 0.355 | 5.000 | 1.817 | 0.350 | | | |
| | SE | 6.000 | 0.914 | 0.140 | 3.000 | 0.835 | 0.069 | 5.000 | 1.917 | 0.232 | | | |
| | SR | 6.000 | 424.060 | 25.937 | 3.000 | 257.167 | 27.233 | 5.000 | 360.100 | 45.688 | | | |
| | WEIGHT:D/A | 6.000 | 3.766 | 0.164 | 3.000 | 3.509 | 0.285 | 5.000 | 3.405 | 0.103 | | | |
| | ZN | 6.000 | 20.112 | 2.603 | 3.000 | 47.527 | 1.199 | 5.000 | 42.684 | 2.861 | | | |
| ZP | ZP | 6.000 | 2.260 | 1.370 | 2.000 | 1.577 | 0.033 | 5.000 | 0.000 | 0.000 | | | |

Table 13. Mean concentration of elements in *Bairdiella* Muscle relative to sampling period and station.

| December | | | | April | | | | July | | | | October | | | |
|------------|-------|-----------|----------|------------|-------|-----------|----------|------------|-------|-----------|-----------|------------|-------|-----------|----------|
| SP | AS | BR | CA | AS | BR | CA | AS | BR | CA | AS | BR | CA | AS | BR | CA |
| AS | 8.000 | 0.520 | 0.207 | AS | 4.000 | 0.790 | 0.379 | AS | 5.000 | 0.523 | 0.224 | AS | 3.000 | 0.509 | 0.072 |
| BR | 8.000 | 2.825 | 0.497 | BR | 4.000 | 3.291 | 0.638 | BR | 5.000 | 3.629 | 0.973 | BR | 3.000 | 3.110 | 0.290 |
| CA | 8.000 | 511.425 | 157.391 | CA | 4.000 | 770.375 | 513.331 | CA | 5.000 | 581.000 | 280.512 | CA | 3.000 | 532.733 | 231.395 |
| CU | 8.000 | 0.613 | 0.140 | CU | 4.000 | 0.978 | 0.401 | CU | 5.000 | 0.701 | 0.119 | CU | 3.000 | 0.484 | 0.050 |
| FE | 8.000 | 16.025 | 7.915 | FE | 4.000 | 20.030 | 3.708 | FE | 5.000 | 17.538 | 3.748 | FE | 3.000 | 21.070 | 6.008 |
| FISHWEIGHT | 8.000 | 207.330 | 71.474 | FISHWEIGHT | 4.000 | 274.475 | 127.310 | FISHWEIGHT | 5.000 | 210.600 | 127.414 | FISHWEIGHT | 3.000 | 165.500 | 54.252 |
| K | 8.000 | 2097.720 | 1375.212 | K | 4.000 | 2320.000 | 3600.343 | K | 5.000 | 2000.000 | 0.004 | K | 3.000 | 101.001 | 0.014 |
| PB | 8.000 | 0.209 | 0.155 | PB | 4.000 | 0.123 | 0.026 | PB | 5.000 | 21344.000 | 2401.173 | PB | 3.000 | 24470.000 | 3161.313 |
| RB | 8.000 | 4.674 | 0.384 | RB | 4.000 | 9.343 | 1.010 | RB | 5.000 | 0.222 | 0.027 | RB | 3.000 | 0.623 | 0.387 |
| SE | 8.000 | 0.101 | 0.049 | SE | 4.000 | 0.176 | 0.135 | SE | 5.000 | 6.054 | 1.569 | SE | 3.000 | 5.733 | 0.823 |
| SR | 8.000 | 3.631 | 1.118 | SR | 4.000 | 5.612 | 2.608 | SR | 5.000 | 0.197 | 0.114 | SR | 3.000 | 0.918 | 0.123 |
| WEIGHT:D/A | 8.000 | 19.964 | 0.913 | WEIGHT:D/A | 4.000 | 17.245 | 2.138 | WEIGHT:D/A | 5.000 | 17.756 | 1.821 | WEIGHT:D/A | 3.000 | 4.281 | 1.230 |
| ZN | 8.000 | 16.074 | 1.712 | ZN | 4.000 | 15.320 | 1.632 | ZN | 5.000 | 16.486 | 1.509 | ZN | 3.000 | 17.973 | 0.823 |
| SC | | | | | | | | | | | | | | | |
| PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| AS | 8.000 | 0.550 | 0.168 | AS | 4.000 | 0.542 | 0.044 | AS | 5.000 | 0.660 | 0.390 | AS | 6.000 | 0.437 | 0.108 |
| BR | 8.000 | 2.802 | 0.693 | BR | 4.000 | 3.277 | 0.526 | BR | 5.000 | 2.442 | 1.558 | BR | 6.000 | 3.329 | 0.967 |
| CA | 8.000 | 620.187 | 307.663 | CA | 4.000 | 552.350 | 30.025 | CA | 5.000 | 495.180 | 417.083 | CA | 6.000 | 627.566 | 227.777 |
| CU | 8.000 | 0.610 | 0.160 | CU | 4.000 | 0.784 | 0.240 | CU | 5.000 | 0.445 | 0.295 | CU | 6.000 | 0.386 | 0.054 |
| FE | 8.000 | 16.260 | 2.043 | FE | 4.000 | 21.022 | 4.132 | FE | 5.000 | 13.530 | 8.673 | FE | 6.000 | 21.575 | 3.061 |
| FISHWEIGHT | 8.000 | 210.387 | 84.632 | FISHWEIGHT | 4.000 | 294.875 | 152.848 | FISHWEIGHT | 5.000 | 187.400 | 114.701 | FISHWEIGHT | 6.000 | 263.667 | 101.212 |
| K | 8.000 | 22445.000 | 1529.276 | K | 4.000 | 23615.000 | 3161.629 | K | 5.000 | 19394.000 | 10947.277 | K | 6.000 | 20.104 | 0.022 |
| RB | 8.000 | 5.037 | 0.463 | RB | 4.000 | 4.744 | 0.575 | RB | 5.000 | 1.000 | 0.302 | RB | 6.000 | 22905.000 | 2420.395 |
| SE | 8.000 | 0.133 | 0.057 | SE | 4.000 | 0.124 | 0.074 | SE | 5.000 | 6.043 | 2.078 | SE | 6.000 | 0.371 | 0.084 |
| SR | 8.000 | 5.158 | 3.535 | SR | 4.000 | 5.124 | 1.422 | SR | 5.000 | 5.523 | 3.177 | SR | 6.000 | 6.313 | 1.771 |
| WEIGHT:D/A | 8.000 | 18.842 | 1.261 | WEIGHT:D/A | 4.000 | 17.377 | 1.173 | WEIGHT:D/A | 5.000 | 17.024 | 2.688 | WEIGHT:D/A | 6.000 | 17.260 | 0.584 |
| ZN | 8.000 | 17.010 | 1.311 | ZN | 4.000 | 14.530 | 1.422 | ZN | 5.000 | 13.124 | 7.571 | ZN | 6.000 | 17.690 | 2.637 |
| BB | | | | | | | | | | | | | | | |
| PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| AS | 4.000 | 0.604 | 0.524 | AS | 4.000 | 3.745 | 0.833 | AS | 4.000 | 434.975 | 189.509 | AS | 4.000 | 0.655 | 0.123 |
| BR | 4.000 | 4.000 | 0.629 | BR | 4.000 | 0.855 | 0.431 | BR | 4.000 | 26.932 | 12.858 | BR | 4.000 | 4.885 | 0.536 |
| CA | 4.000 | 4.000 | 0.629 | CA | 4.000 | 0.081 | 0.011 | CA | 4.000 | 4.510 | 1.771 | CA | 4.000 | 0.028 | 2.365 |
| FE | 4.000 | 4.000 | 0.302 | FE | 4.000 | 17.272 | 1.983 | FE | 4.000 | 15.707 | 0.786 | FE | 4.000 | 14.737 | 3.135 |
| FISHWEIGHT | 4.000 | 237.175 | 176.061 | FISHWEIGHT | 4.000 | 231.750 | 140.323 | FISHWEIGHT | 5.000 | 245.600 | 121.428 | FISHWEIGHT | 7.000 | 247.000 | 57.364 |
| K | 4.000 | 22965.000 | 523.625 | K | 4.000 | 19976.000 | 4210.665 | K | 5.000 | 0.087 | 0.063 | K | 5.000 | 0.070 | 0.009 |
| RB | 4.000 | 4.000 | 0.583 | RB | 4.000 | 0.104 | 0.019 | RB | 4.000 | 19272.000 | 4608.451 | RB | 5.000 | 23270.000 | 1738.841 |
| SE | 4.000 | 4.000 | 0.535 | SE | 4.000 | 4.510 | 1.771 | SE | 5.000 | 0.212 | 0.159 | SE | 6.000 | 0.291 | 0.053 |
| SR | 4.000 | 4.000 | 0.535 | SR | 4.000 | 14.510 | 1.771 | SR | 5.000 | 18.032 | 4.625 | SR | 7.000 | 20.089 | 4.066 |
| WEIGHT:D/A | 4.000 | 19.690 | 5.597 | WEIGHT:D/A | 4.000 | 14.737 | 3.135 | WEIGHT:D/A | 5.000 | 18.460 | 1.266 | WEIGHT:D/A | 7.000 | 18.297 | 1.005 |
| ZN | 4.000 | 4.000 | 0.535 | ZN | 4.000 | 15.936 | 0.937 | ZN | 5.000 | 16.924 | 1.472 | ZN | 7.000 | 16.924 | 1.472 |
| RH | | | | | | | | | | | | | | | |
| PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| AS | 4.000 | 0.443 | 0.070 | AS | 5.000 | 0.666 | 0.173 | AS | 7.000 | 0.535 | 0.123 | AS | 7.000 | 2.959 | 0.624 |
| BR | 4.000 | 3.134 | 0.978 | BR | 5.000 | 3.891 | 1.951 | BR | 7.000 | 590.614 | 221.545 | BR | 7.000 | 0.438 | 0.086 |
| CA | 4.000 | 527.400 | 255.061 | CA | 5.000 | 734.240 | 700.369 | CA | 7.000 | 590.614 | 221.545 | CA | 7.000 | 0.438 | 0.086 |
| CU | 4.000 | 0.629 | 0.141 | CU | 5.000 | 0.536 | 0.116 | CU | 5.000 | 18.032 | 4.625 | CU | 7.000 | 20.089 | 4.066 |
| FE | 4.000 | 11.942 | 3.482 | FE | 5.000 | 1.032 | 0.482 | FE | 5.000 | 1.032 | 0.482 | FE | 7.000 | 20.089 | 4.066 |
| FISHWEIGHT | 4.000 | 231.750 | 140.323 | FISHWEIGHT | 5.000 | 245.600 | 121.428 | FISHWEIGHT | 7.000 | 247.000 | 57.364 | FISHWEIGHT | 7.000 | 0.070 | 0.009 |
| K | 4.000 | 19976.000 | 4210.665 | K | 5.000 | 19272.000 | 4608.451 | K | 5.000 | 19272.000 | 4608.451 | K | 6.000 | 0.291 | 0.053 |
| RB | 4.000 | 4.000 | 0.583 | RB | 5.000 | 0.212 | 0.159 | RB | 5.000 | 0.212 | 0.159 | RB | 7.000 | 0.291 | 0.053 |
| SE | 4.000 | 4.000 | 0.535 | SE | 5.000 | 0.367 | 0.134 | SE | 5.000 | 0.367 | 0.134 | SE | 7.000 | 0.308 | 0.136 |
| NI | 4.000 | 0.104 | 0.019 | NI | 5.000 | 0.212 | 0.159 | NI | 5.000 | 0.212 | 0.159 | NI | 7.000 | 0.298 | 0.167 |
| SR | 4.000 | 4.510 | 1.771 | SR | 5.000 | 1.032 | 0.482 | SR | 5.000 | 1.032 | 0.482 | SR | 7.000 | 1.032 | 0.482 |
| WEIGHT:D/A | 4.000 | 19.690 | 5.597 | WEIGHT:D/A | 5.000 | 18.460 | 1.266 | WEIGHT:D/A | 7.000 | 18.297 | 1.005 | WEIGHT:D/A | 7.000 | 16.924 | 1.472 |
| ZN | 4.000 | 4.000 | 0.535 | ZN | 5.000 | 16.924 | 1.472 | ZN | 5.000 | 16.924 | 1.472 | ZN | 7.000 | 16.924 | 1.472 |

Table 14. Mean concentration of elements in *Bairdiella* Liver relative to sampling period and station.

| SP | December | | | April | | | July | | | October | | | | | | |
|----|------------|-------|-----------|---------|---------------------|-------|-----------|---------|---------------------|---------|-----------|---------|---------------------|-------|-----------|---------|
| | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| SP | AS | 1,000 | 0.295 | | AS | 1,000 | 0.429 | | AS | 1,000 | 0.935 | | AS | 1,000 | 1.020 | |
| | BR | 1,000 | 1.537 | | BR | 1,000 | 1.910 | | BR | 1,000 | 4.909 | | BR | 1,000 | 2.037 | |
| | CA | 1,000 | 471.500 | | CA | 1,000 | 198.100 | | CA | 1,000 | 2572.000 | | CA | 1,000 | 8.905 | |
| | CU | 1,000 | 8.173 | | CU | 1,000 | 3.123 | | CU | 1,000 | 6.708 | | CU | 1,000 | 4087.000 | |
| | FE | 1,000 | 412.600 | | FE | 1,000 | 312.700 | | FE | 1,000 | 841.600 | | FE | 1,000 | 4.857 | |
| | FISHWEIGHT | 6,000 | 207.350 | 71.474 | FISHWEIGHT | 4,000 | 274.475 | 127.310 | FISHWEIGHT | 5,000 | 210.600 | 127.414 | FISHWEIGHT | 1,000 | 1614.000 | |
| | K | 1,000 | 11200.000 | | K | 1,000 | 10680.000 | | K | 1,000 | 1174 | | K | 3,000 | 168.300 | 54.252 |
| | MN | 1,000 | 1.513 | | MN | 1,000 | 2.694 | | MN | 1,000 | 11400.000 | | MN | 1,000 | 7616.000 | |
| | RB | 1,000 | 2.778 | | RB | 1,000 | 2.865 | | RB | 1,000 | 0.991 | | RB | 1,000 | 2.398 | |
| | SE | 1,000 | 0.052 | | SE | 1,000 | 0.053 | | SE | 1,000 | 0.227 | | SE | 1,000 | 38.690 | |
| | SR | 1,000 | 6.090 | | SR | 1,000 | 3.998 | | SR | 1,000 | 3.571 | | SR | 1,000 | 1.679 | 1.253 |
| | WEIGHT | 9,000 | 6.659 | 8.851 | WEIGHT | 5,000 | 10.680 | 9.867 | WEIGHT | 1,000 | 0.123 | | WEIGHT | 4,000 | 15.610 | |
| | WEIGHT:D/A | 1,000 | 25.450 | | WEIGHT:D/A | 1,000 | 26.650 | | WEIGHT:D/A | 6,000 | 26.880 | | WEIGHT:D/A | 1,000 | 47.850 | |
| | ZN | 1,000 | 51.060 | | ZN | 1,000 | 50.210 | | ZN | 1,000 | 4.400 | 4.893 | ZN | 1,000 | 17.110 | |
| | | | | | | | | | | | | | | 1,000 | 63.120 | |
| | | | | | | | | | | | | | | 1,000 | 13.744 | |
| SC | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| | AS | 1,000 | 0.292 | | AS | 1,000 | 0.246 | | AS | 1,000 | 0.983 | | AS | 1,000 | 1.048 | |
| | BR | 1,000 | 3.736 | | BR | 1,000 | 260.800 | | BR | 1,000 | 2.902 | | BR | 1,000 | 17.030 | |
| | CA | 1,000 | 405.200 | | CA | 1,000 | 2.049 | | CA | 1,000 | 304.400 | | CA | 1,000 | 2140.000 | |
| | CU | 1,000 | 5.985 | | CU | 1,000 | 239.100 | | CU | 1,000 | 5.713 | | CU | 1,000 | 6.376 | |
| | FE | 1,000 | 449.600 | | FE | 1,000 | 294.873 | 152.848 | FE | 1,000 | 379.300 | | FE | 1,000 | 3319.000 | |
| | FISHWEIGHT | 6,000 | 210.387 | 84.632 | FISHWEIGHT | 1,000 | 0.051 | | FISHWEIGHT | 5,000 | 187.400 | 114.701 | FISHWEIGHT | 6,000 | 263.667 | 101.212 |
| | K | 1,000 | 10000.000 | | K | 1,000 | 5807.000 | | K | 1,000 | 0.053 | | K | 1,000 | 0.217 | |
| | MN | 1,000 | 2.104 | | MN | 1,000 | 1.354 | | MN | 1,000 | 4799.000 | | MN | 1,000 | 11790.000 | |
| | RB | 1,000 | 2.922 | | RB | 1,000 | 1.718 | | RB | 1,000 | 1.504 | | RB | 1,000 | 7.886 | |
| | SE | 1,000 | 0.037 | | SE | 1,000 | 0.106 | | SE | 1,000 | 1.778 | | SE | 1,000 | 0.418 | |
| | SR | 1,000 | 5.513 | | SR | 1,000 | 3.826 | | SR | 1,000 | 0.024 | | SR | 1,000 | 0.146 | |
| | WEIGHT | 9,345 | 5.691 | 8.958 | WEIGHT | 5,000 | 14.143 | 13.042 | WEIGHT | 6,000 | 4.936 | | WEIGHT | 1,000 | 3.493 | |
| | WEIGHT:D/A | 1,000 | 27.370 | | WEIGHT:D/A | 1,000 | 36.850 | | WEIGHT:D/A | 6,000 | 2.474 | 2.659 | WEIGHT:D/A | 1,000 | 0.438 | |
| | ZN | 1,000 | 51.511 | | ZN | 1,000 | 34.740 | | ZN | 1,000 | 21.990 | | ZN | 1,000 | 25.940 | |
| | | | | | | | | | | | | | | 7,000 | 3.242 | 3.608 |
| | | | | | | | | | | | | | | 1,000 | 11.450 | |
| | | | | | | | | | | | | | | 1,000 | 57.820 | |
| | | | | | | | | | | | | | | 1,000 | 0.241 | |
| BB | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV | PARAMETER | N | A-MEAN | STD DEV |
| | AS | 1,000 | 0.266 | | AS | 1,000 | 2.130 | | AS | 1,000 | 0.266 | | AS | 1,000 | 0.240 | |
| | BR | 1,000 | 351.500 | | BR | 1,000 | 351.500 | | BR | 1,000 | 2.042 | | BR | 1,000 | 2.042 | |
| | CA | 1,000 | 351.500 | | CA | 1,000 | 351.500 | | CA | 1,000 | 2.042 | | CA | 1,000 | 2.042 | |
| | CU | 1,000 | 351.500 | | CU | 1,000 | 351.500 | | CU | 1,000 | 2.042 | | CU | 1,000 | 2.042 | |
| | FE | 1,000 | 332.100 | | FE | 1,000 | 237.175 | 176.061 | FE | 1,000 | 0.053 | | FE | 1,000 | 0.053 | |
| | FISHWEIGHT | 4,000 | 237.175 | 176.061 | FISHWEIGHT | 1,000 | 7750.000 | | FISHWEIGHT | 4,000 | 231.750 | 140.523 | FISHWEIGHT | 1,000 | 12130.000 | |
| | GA | 1,000 | 0.053 | | GA | 1,000 | 0.053 | | GA | 1,000 | 4.168 | | GA | 1,000 | 5.917 | |
| | MN | 1,000 | 2.875 | | MN | 1,000 | 2.875 | | MN | 1,000 | 2.443 | | MN | 1,000 | 0.126 | |
| | RB | 1,000 | 2.042 | | RB | 1,000 | 2.042 | | RB | 1,000 | 0.077 | | RB | 1,000 | 0.077 | |
| | SE | 1,000 | 0.024 | | SE | 1,000 | 0.024 | | SE | 1,000 | 0.024 | | SE | 1,000 | 0.024 | |
| | SR | 1,000 | 6.675 | | SR | 1,000 | 10.686 | 10.217 | SR | 1,000 | 5.258 | | SR | 1,000 | 3.199 | |
| | WEIGHT | 5,000 | 10.686 | | WEIGHT | 5,000 | 14.143 | | WEIGHT | 5,000 | 11.780 | | WEIGHT | 1,000 | 0.102 | |
| | WEIGHT:D/A | 1,000 | 30.710 | | WEIGHT:D/A | 1,000 | 36.850 | | WEIGHT:D/A | 6,000 | 21.990 | | WEIGHT:D/A | 1,000 | 15.110 | |
| | ZN | 1,000 | 31.640 | | ZN | 1,000 | 31.640 | | ZN | 1,000 | 38.150 | | ZN | 1,000 | 2.577 | 3.160 |
| | | 1,000 | 0.120 | | | | | | | | | | | 1,000 | 17.070 | |
| RH | PARAMETER | N | A-MEAN | STD DEV | Insufficient sample | N | A-MEAN | STD DEV | Insufficient sample | N | A-MEAN | STD DEV | Insufficient sample | N | A-MEAN | STD DEV |
| | AS | 1,000 | 0.372 | | AS | 1,000 | 1.132 | | AS | 1,000 | 0.996 | | AS | 1,000 | 10.780 | |
| | BR | 1,000 | 0.654 | | BR | 1,000 | 306.600 | | BR | 1,000 | 4.866 | | BR | 1,000 | 2646.000 | |
| | CA | 1,000 | 2.302 | | CA | 1,000 | 217.400 | | CA | 1,000 | 247.000 | 57.364 | CA | 1,000 | 0.200 | |
| | CU | 1,000 | 2.302 | | CU | 1,000 | 217.400 | | CU | 1,000 | 247.000 | 57.364 | CU | 1,000 | 0.200 | |
| | FE | 1,000 | 2.302 | | FE | 1,000 | 217.400 | | FE | 1,000 | 247.000 | 57.364 | FE | 1,000 | 0.200 | |
| | FISHWEIGHT | 4,000 | 231.750 | 140.523 | FISHWEIGHT | 1,000 | 5254.000 | | FISHWEIGHT | 4,000 | 231.750 | 140.523 | FISHWEIGHT | 1,000 | 12130.000 | |
| | K | 1,000 | 4.168 | | K | 1,000 | 4.168 | | K | 1,000 | 4.168 | | K | 1,000 | 0.126 | |
| | RB | 1,000 | 2.443 | | RB | 1,000 | 2.443 | | RB | 1,000 | 2.443 | | RB | 1,000 | 0.126 | |
| | SE | 1,000 | 0.077 | | SE | 1,000 | 0.077 | | SE | 1,000 | 0.077 | | SE | 1,000 | 0.077 | |
| | SR | 1,000 | 5.258 | | SR | 1,000 | 5.258 | | SR | 1,000 | 5.258 | | SR | 1,000 | 5.258 | |
| | WEIGHT | 5,000 | 11.780 | 12.262 | WEIGHT | 5,000 | 11.780 | | WEIGHT | 5,000 | 11.780 | | WEIGHT | 1,000 | 0.102 | |
| | WEIGHT:D/A | 1,000 | 31.190 | | WEIGHT:D/A | 1,000 | 31.190 | | WEIGHT:D/A | 6,000 | 21.990 | | WEIGHT:D/A | 1,000 | 15.110 | |
| | ZN | 1,000 | 38.150 | | ZN | 1,000 | 38.150 | | ZN | 1,000 | 38.150 | | ZN | 1,000 | 17.070 | 3.160 |
| | | | | | | | | | | | | | | 1,000 | 53.310 | |
| | | | | | | | | | | | | | | 1,000 | 0.128 | |

Table 15. Mean concentration of elements in *Bairdiella* Bone relative to sampling period and station.

December

April

July

October

| PARAMETER | N | A-MEAN | STD DEV |
|-----------|-------|------------|-----------|
| AS | 6.000 | 2.508 | 0.539 |
| BR | 5.000 | 1.974 | 0.420 |
| CA | 8.000 | 154150.000 | 11074.811 |
| CU | 1.000 | 0.877 | |
| FE | 6.000 | 118.739 | 90.213 |

FISHWEIGHT

| | | | |
|----|-------|-----------|----------|
| GA | 6.000 | 207.350 | 71.474 |
| GA | 5.000 | 0.577 | 0.098 |
| K | 8.000 | 12243.000 | 1742.658 |
| MN | 8.000 | 8.112 | 2.060 |
| RB | 8.000 | 1.730 | 0.435 |

| | | | |
|------------|-------|---------|--------|
| SE | 6.000 | 2.424 | 0.699 |
| SR | 8.000 | 553.075 | 69.755 |
| WEIGHT:D/A | 8.000 | 3.539 | 0.162 |
| ZN | 6.000 | 40.555 | 3.522 |
| ZR | 4.000 | 1.752 | 0.634 |

FISHWEIGHT

GA

K

MN

NI

RB

SE

SR

WEIGHT:D/A

ZN

ZR

FISHWEIGHT

GA

K

MN

NI

RB

SE

SR

WEIGHT:D/A

ZN

ZR

FISHWEIGHT

GA

K

MN

NI

RB

SE

SR

WEIGHT:D/A

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Table 16. Mean concentration of elements in sargo muscle relative to sampling period and station.

| PARAMETER | DECEMBER | | | APRIL | | | JULY | | | OCTOBER | | | |
|-----------|------------|--------|-----------|---------|--------|-----------|-----------|--------|-----------|---------|-----------|----------|-------|
| | N | A-MEAN | STD DEV | N | A-MEAN | STD DEV | N | A-Mean | Std Dev. | N | A-MEAN | STD DEV | |
| SP | AS | 2,000 | 0.402 | 0.279 | 4,000 | 0.557 | 0.226 | AS | 1,000 | 0.446 | 3,000 | 0.694 | 0.066 |
| | BR | 2,000 | 4.100 | 0.379 | 4,000 | 3.304 | 2.124 | BR | 1,745 | 3,000 | 4.982 | 1.786 | |
| | CA | 2,000 | 2334.000 | 359.210 | 4,000 | 8421.250 | 14795.042 | CA | 505.300 | 3,000 | 679.033 | 140.856 | |
| | CU | 2,000 | 0.813 | 0.079 | 4,000 | 0.823 | 0.461 | CU | 0.323 | 3,000 | 0.552 | 0.131 | |
| | FE | 2,000 | 17.720 | 2.772 | 4,000 | 16.940 | 2.507 | FE | 15.330 | 3,000 | 347.333 | 50.332 | |
| | FISHWEIGHT | 2,000 | 293.200 | 4.808 | 5,000 | 192.160 | 150.758 | FN | 432.000 | 3,000 | 19246.667 | 2795.019 | |
| | GA | 1,000 | 0.024 | | 2,000 | 0.108 | 0.005 | GA | 0.076 | 3,000 | 0.651 | 0.233 | |
| | K | 2,000 | 21665.000 | 854.594 | 4,000 | 13016.250 | 8071.738 | K | 18470.000 | 3,000 | 5.222 | 0.733 | |
| | RB | 2,000 | 6.400 | 0.786 | 1,000 | 3.132 | | NI | 0.252 | 3,000 | 17.320 | 1.275 | |
| | SE | 2,000 | 0.163 | 0.070 | 1,000 | 0.155 | | RB | 4.586 | 3,000 | 13.327 | 0.934 | |
| SP | SR | 2,000 | 17.185 | 0.573 | 4,000 | 3.248 | 2.037 | SE | .042 | | | | |
| | WEIGHT:D/A | 2,000 | 15.220 | 0.776 | 4,000 | 3.180 | 0.201 | SR | 4.756 | | | | |
| | ZN | 2,000 | 17.312 | 2.128 | 4,000 | 27.608 | 46.524 | Wt. | 23.550 | | | | |
| | ZP | | | | 5,000 | 17.606 | 2.526 | Zn | 10.910 | | | | |
| | | | | | 1,000 | 0.013 | | | | | | | |

SC

| | | |
|-----|-----------|-----------|
| AS | 0.680 | 0.524 |
| BR | 1.908 | 3.400 |
| CA | 2029.000 | 1221.000 |
| CU | 9.903 | .616 |
| FE | 247.100 | 16.840 |
| FN | 22840.000 | 160.000 |
| GA | 5.723 | 28920.000 |
| K | .176 | 8.033 |
| RB | 11.540 | 0.066 |
| SE | 16.46 | 5.270 |
| SR | 12.640 | 15.560 |
| D/4 | | 18.190 |
| ZN | | |

RH

| PARAMETER | N | A-MEAN | STD DEV |
|------------|-------|-----------|----------|
| AS | 5,000 | 0.789 | 0.170 |
| BR | 5,000 | 4.667 | 0.923 |
| CA | 5,000 | 329.776 | 233.111 |
| CU | 5,000 | 0.715 | 0.158 |
| FE | 5,000 | 20.212 | 3.691 |
| FISHWEIGHT | 6,000 | 318.000 | 123.653 |
| GA | 1,000 | 0.102 | |
| K | 5,000 | 21410.000 | 2648.728 |
| NI | 1,000 | 0.216 | |
| RB | 5,000 | 6.432 | 0.692 |
| SE | 5,000 | 0.112 | 0.034 |
| SR | 5,000 | 3.006 | 1.274 |
| WEIGHT:D/A | 6,000 | 18.003 | 0.913 |
| ZN | 5,000 | 15.414 | 2.360 |

Table 17. Mean concentration of elements in sargo liver relative to sampling period and station.

| | | |
|----|----|-------|
| SC | As | .123 |
| | Ca | 27.45 |
| | CU | .469 |
| | FE | 76.6 |
| | FW | 247.1 |
| | K | 1257. |
| | MN | .289 |
| | RB | .291 |
| | SE | .013 |
| | SR | .223 |
| | WT | 2.617 |
| | ST | 36.03 |
| | ZN | 12.82 |
| | ZR | .031 |

Insufficient sample
for analyses.

| PARAMETER | N | A-MEAN | STD DEV |
|-------------------|--------------|----------------|----------------|
| AS | 1.000 | 1.208 | |
| BR | 1.000 | 2.658 | |
| CA | 1.000 | 233.800 | |
| CU | 1.000 | 2.092 | |
| FE | 1.000 | 287.600 | |
| FISHWEIGHT | 6.000 | 318.000 | 123.653 |
| GA | 1.000 | 0.044 | |
| K | 1.000 | 4188.000 | |
| MN | 1.000 | 1.374 | |
| RB | 1.000 | 1.282 | |
| SE | 1.000 | 0.082 | |
| SR | 1.000 | 0.382 | |
| WEIGHT | 7.000 | 6.382 | |
| WEIGHT:D/A | 1.000 | 59.450 | |
| ZN | 1.000 | 29.440 | |

Table 18. Mean concentration of elements in sargo bone relative to sampling period and station.

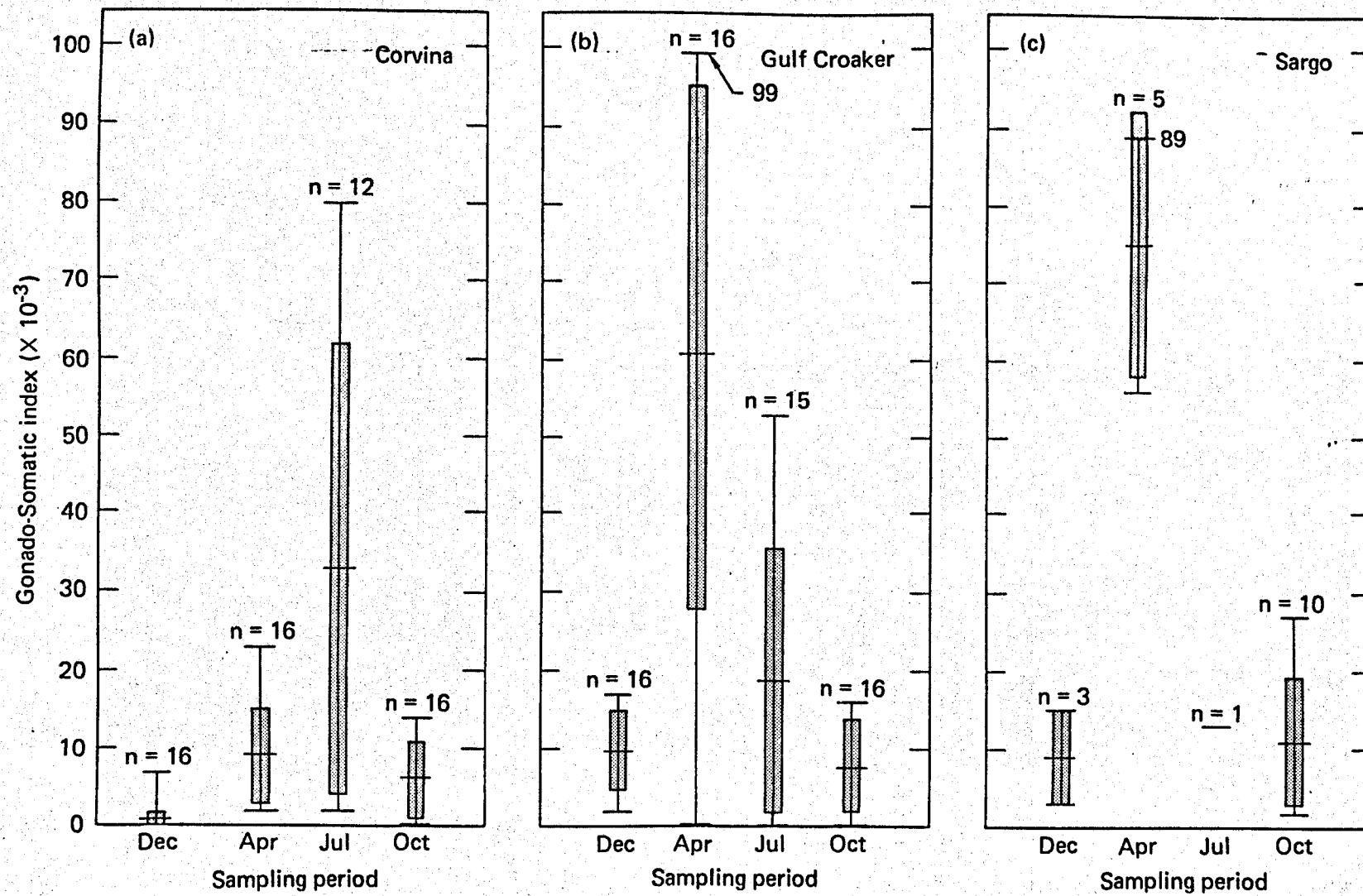


Figure 1. Gonado-Somatic index vs. sampling period for Salton Sea fishes (Go-So index = $\frac{\text{gonad wt.}}{\text{fish wt.}}$)

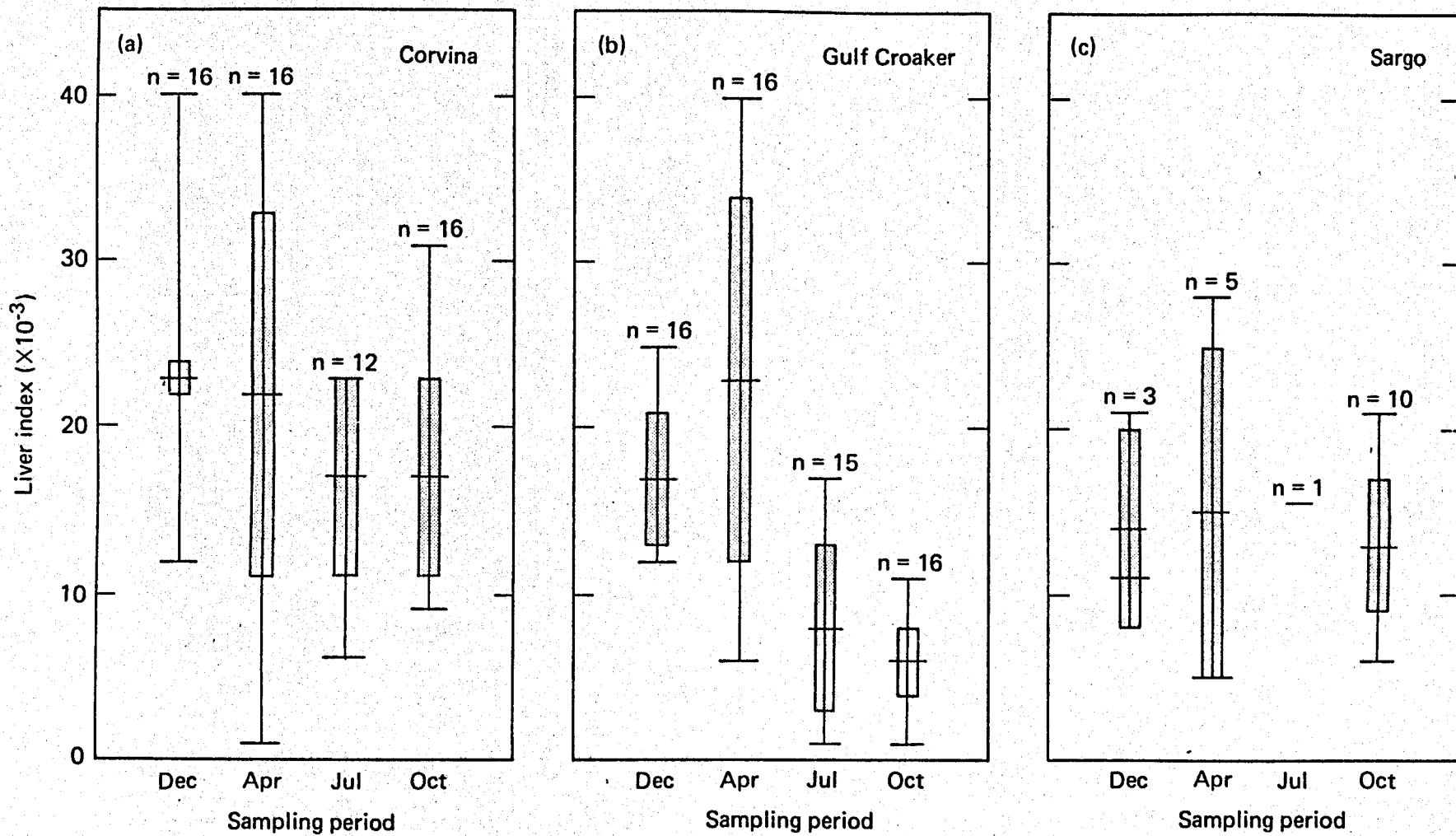


Figure 2. Liver index vs. sampling period for Salton Sea fishes (Liver index = $\frac{\text{liver wt.}}{\text{fish wt.}}$)