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Summary of Avian Egg Sampling at New River Wetlands - May 2003:

BRAWLEY WETLAND SITE

On the morning of 5/28/2003 I met Stephen Charlton (IID), Roy Schroeder (USGS), and Jim Setmire (USBR??) at the **Brawley Wetland site near Legion Rd.**

At the **Brawley Wetland site** the following nests were sampled:

American Coot - 001...located in the cattails at the south end of the sediment basin [GPS NAD 27 lat/long: 32 57 24 N / -115 34 18 W]. The nest was active, and contained 9 eggs. One egg was sampled [sample id 2269001A]. It was processed 6/02/2003. The egg contained a late-stage, live, normal embryo.

American Coot - 002...located among cattails in one of the subcells of Pond 2 [GPS NAD 27 lat/long: 32 57 24 N / -115 34 14 W]. The nest was active, and contained 7 eggs. Three eggs were sampled [sample id's 2269002A; 2269002B; 2269002C]. The eggs were processed 6/02/2003. Egg A contained a mid-stage live, normal embryo. Egg B contained an early-stage, live, unassessable (to young to assess) embryo. Egg C contained an early-stage, live, unassessable (to young to assess) embryo.

Pied-billed Grebe - 001...located in open water on the north side of Pond 1 [GPS NAD 27 lat/long: 32 57 28 N / -115 34 14 W]. The nest was of unknown status, and contained a single egg. One egg was sampled [sample id 2369001A]. The egg was processed 6/02/2003. It was a fresh, fertile, egg, not yet showing any development. It was probably a freshly layed egg.

In the course of nest searching at the **Brawley Wetland site**, an additional 4 empty coot nests were found and 2 empty grebe nests were found.

After spending about 2.5 hrs at the Brawley Wetland, we moved to the **Imperial Wetland site near Wienert Rd.**

IMPERIAL WETLAND SITE

At the **Imperial Wetland site** the following nests were sampled:

American Coot - 001 ... located in cattails ringing the south shore of the south sediment basin [GPS NAD 27 lat/long: 32 52 31 N / -115 38 54 W]. The nest was inactive and contained zero eggs and two dead chicks. Cause of death was unknown, but no signs of predation were evident. The carcasses were collected, but later determined to be too decomposed for valid sample submission.

No eared grebe
nests

American Coot – 002...located in cattails ringing the south shore of the south sediment basin [GPS NAD 27 lat/long: 32 52 36 N / -115 38 47 W]. The nest was active and contained 3 eggs. One egg was sampled [sample id 2267002A]. The egg was processed 6/02/2003. It was a fresh, fertile, not yet showing any development. It was probably a freshly layed egg.

American Coot – 003... located in cattails ringing the north shore of the south sediment basin [GPS NAD 27 lat/long: 32 52 35 N / -115 38 52 W]. The nest was active and contained 6 eggs. Three eggs were sampled [sample id's 2267003A; 2267003B; 2267003C]. The eggs were processed 6/02/2003. Egg A contained a mid-stage, live, normal, embryo. Egg B contained an early-stage, live, unassessable (too young to fully assess; however the eyes were normal) embryo. Egg C contained a mid-staged, live, normal, embryo.

Common Moorhen – 001...located in cattails near the outlet structure in Cell 4 [GPS NAD 27 lat/long: 32 52 58 N / -115 38 00 W]. The nest was active and contained 4 eggs plus one live, normal, hatched chick. One egg was sampled [sample id 4367001A]. The egg was processed 6/02/2003. It contained a late-stage, live, normal, embryo.

In the course of nest searching at the **Imperial Wetland site**, an additional 2 empty coot nests were found, 3 empty grebe nests were found, and 2 empty moorhen nests were found.

EGG CHEMISTRY – SELENIUM

<u>Sample id</u>		<u>Se concentration (PPM, dry wt.)</u>
2269001A	<i>American coot egg</i>	2.7
2269002A	<i>American coot eggs</i>	4.6
2269002B	<i>Brawley WLS site</i>	4.3
2269002C		4.2
2369001A	<i>Pied-billed grebe</i>	5.2
2267002A	<i>American coot</i>	2.7
2267003A	<i>American coot egg</i>	4.2
2267003B		4.1
2267003C		5.0
4367001A	<i>Common moorhen</i>	4.0
Brawley Coot Average Value (N=4)		3.95
Imperial Coot Average Value (N=4)		4.00

EGG CHEMISTRY - OTHER ELEMENTS (PPM, dry wt.)

Sample id	Al	As	B	Ba	Be	Cd	Cr	Cu	Fe	Hg	Mg	Mn	Mo	Ni	Pb	Sr	V	Zn
2269001A	<3	<0.2	2	1	<0.1	<0.1	<0.5	4.1	78	0.39	618	7.5	<2	<0.5	<0.2	16	<0.5	57
2269002A	<3	0.3	4	0.6	<0.1	<0.1	<0.5	3.4	98	0.32	503	4.5	<2	<0.5	<0.2	12	<0.5	42
2267002A	<3	0.2	<2	1.3	<0.1	<0.1	<0.5	3.3	59	<0.1	429	3.4	<2	<0.5	<0.2	13	<0.5	61
2267003A	<3	<0.2	<2	2.8	<0.1	<0.1	<0.5	2.8	100	0.10	408	1	<2	<0.5	<0.2	15	<0.5	60

COMMENTS:

The most interpretable data are the data for coots because coot eggs have been sampled extensively across a wide range of habitats in California (and throughout the western U.S.).

In selenium-normal environments the median Se concentration in eggs is 1.3 ppm (dry wgt.) with an interquartile range of 0.8 to 1.8 ppm (dry wgt.). Thus, the selenium concentrations in coot eggs from the New River wetlands (median = 4.2 ppm Se dry wgt.) are about 3-times higher than normal. However, even the maximum value of 5.2 ppm Se dry wgt. is below the range of 6 to 10 ppm Se dry wgt. within which the toxic threshold for coot eggs would be expected to occur.

The close correspondence of results for the two sets of three sibling eggs (in both cases < 1 ppm spread in results) that were sampled verifies that coot eggs represent local exposure from the ponds they were nesting on (rather than a mixture of exposures from a wider foraging area).

The results of the metals scan (Al, As, B, Ba, Be, Cd, Cr, Cu, Fe, Hg, Mg, Mn, Mo, Ni, Pb, Sr, V, and Zn) did not reveal anything noteworthy, except for elevated levels of manganese (Mn) in the eggs. I have collected thousands of eggs from scores of sampling sites in California from the Klamath Basin to the Salton Sea over 15 years and have only had two eggs that analyzed out at a higher Mn concentration than the 7.5 ppm Mn dry wgt. maximum found in this set of eggs. Agricultural drainage water commonly contains 50 to 100 times normal background concentrations of manganese, so this result is not surprising, in fact the two other higher Mn eggs in my collections consist of a black-necked stilt egg with 8.1 ppm Mn dry wgt. from an agricultural drainwater evaporation pond, and a pied-billed grebe egg with 7.9 ppm Mn dry wgt. from the San Luis Drain (an agricultural drainage water canal). Because eggs with elevated Mn have been so rare in my collections, I have never done an exhaustive search of the avian literature to determine if any information on toxic thresholds for Mn in avian eggs is available. I would recommend that such a literature search be conducted as part of any evaluation of the environmental performance of the New River wetlands.