

Assessing marine endocrine disruptors in the critically endangered California Condor

MAGGIE STACK

M.S. CANDIDATE FOR ENVIRONMENTAL HEALTH

ADVISOR: DR. EUNHA HOH



Why care about condors?

- Important ecological role
- Populations declined to 22 individuals in 1987



INLAND CONDORS

- *Diet:* livestock/hunted carrion
- *Human dependency:* yes

COASTAL CONDORS

- *Diet:* marine mammal carcasses
- *Human dependency:* no

Eggshell thinning is occurring mostly in coastal condors – is this from their diet of marine mammals?



Photo credit: NOAA Fisheries

Halogenated contaminants in marine mammals

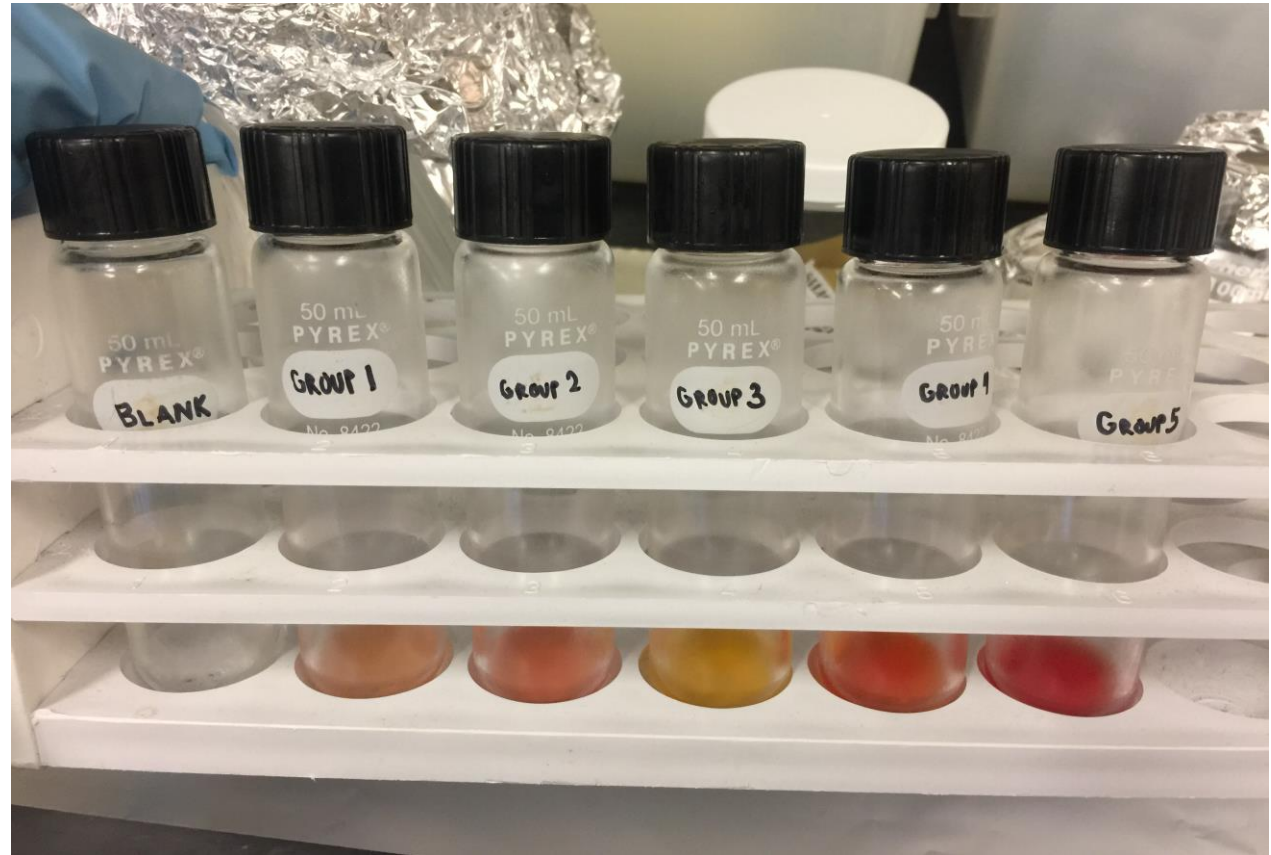
- High lipid content
- Bioaccumulation of toxic compounds
- Endocrine disruption

Proposed research

- Establish and compare halogenated contaminant profiles for:
 1. Both condor groups
 2. Southern Californian marine mammals
 3. Baja California marine mammals

What are our samples?

- Serum samples from condors
- Blubber samples from marine mammals



What are our samples?

Condor Group	# of individual samples	# of pooled samples
Inland	20	10
Coastal	19	7
TOTAL	39	17

How do we find contaminants?

- Non-targeted chemical analysis
 - GPC
 - GCxGC/TOF-MS
 - Discovery of new contaminants



Mass spectral example

Name: DDE

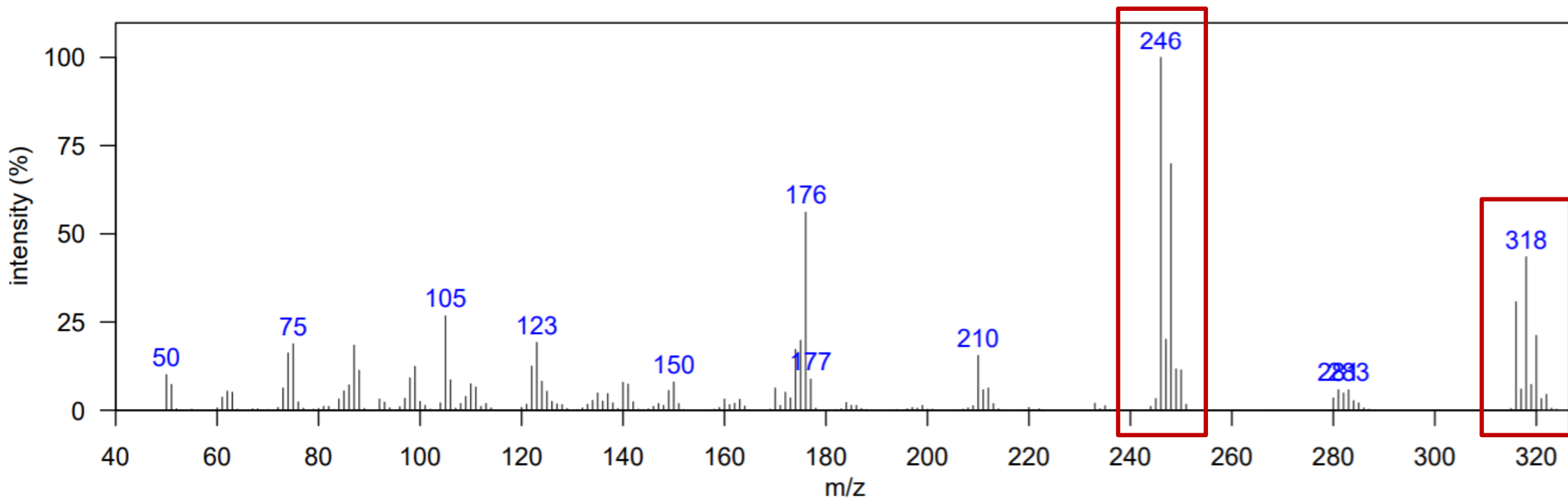
Technical Mixture: DDT 500PPM

Compound Class: major degradation product

Elemental Formula: C₁₄H₈Cl₄

Instrument: GCxGC-TOF, EI, 70 eV

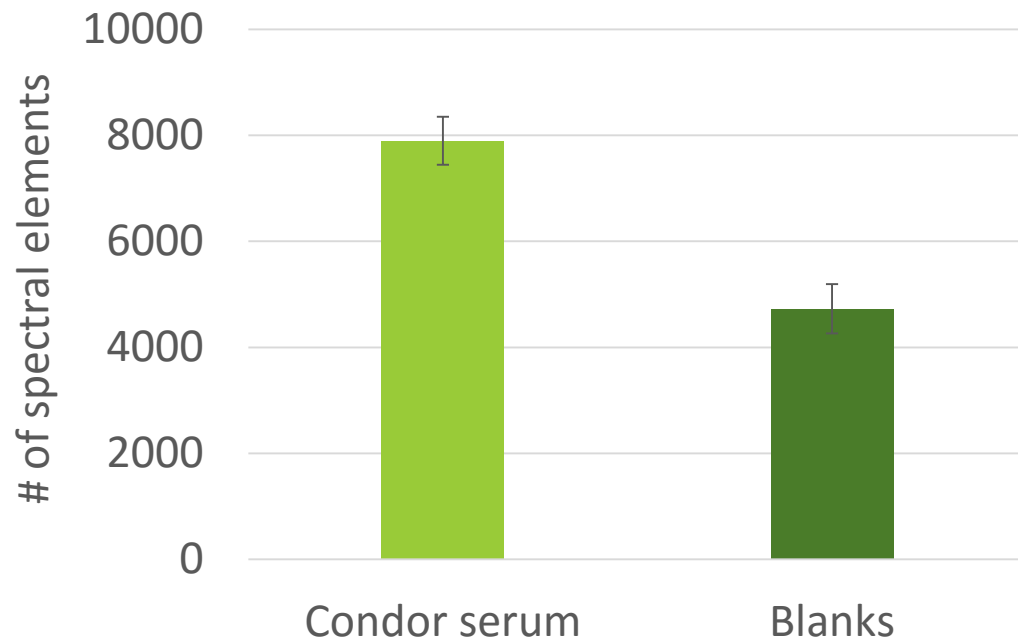
Comment:



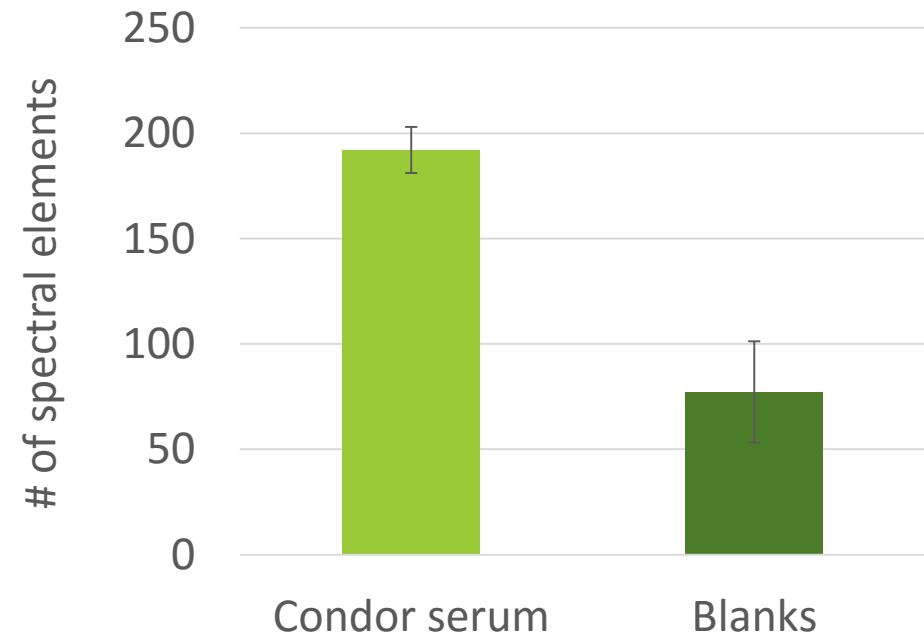
Results

What have we found?

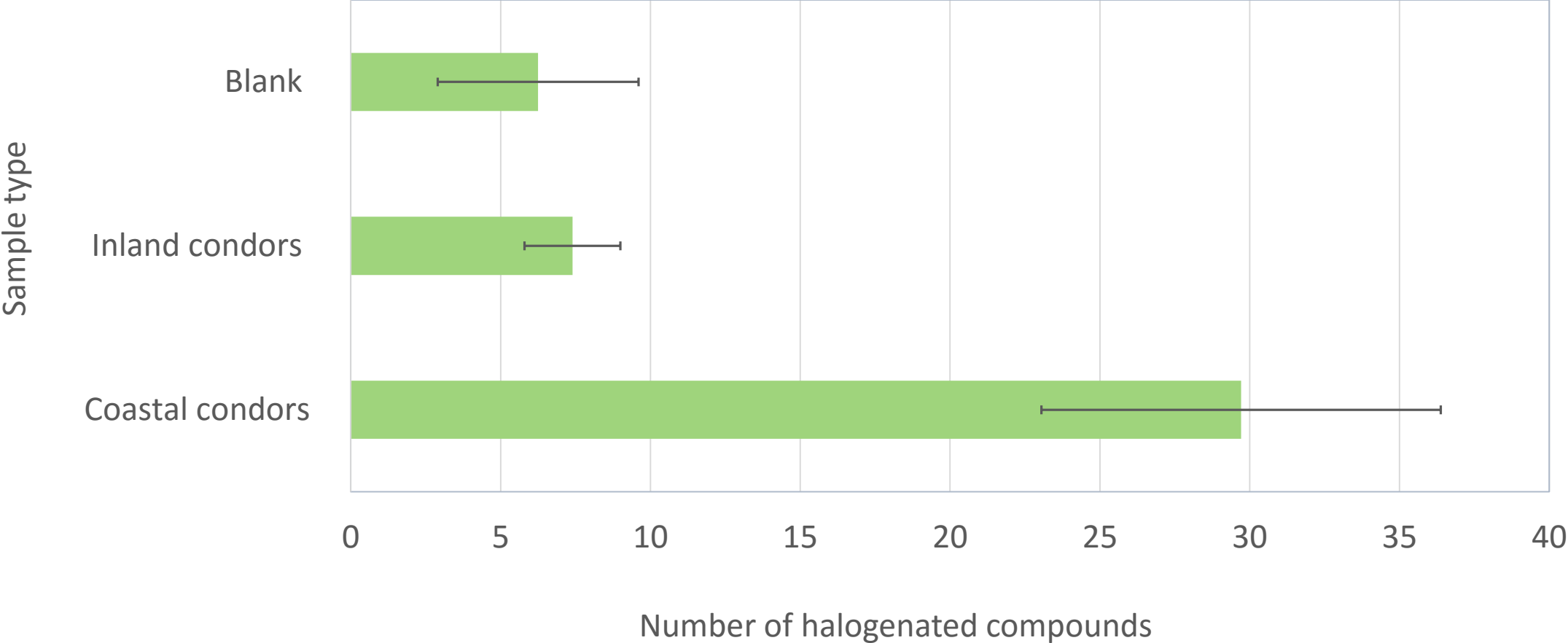
Total initial spectra identified in condor and blank samples (\pm SE)



Potential halogens identified in condor and blank samples (\pm SE)

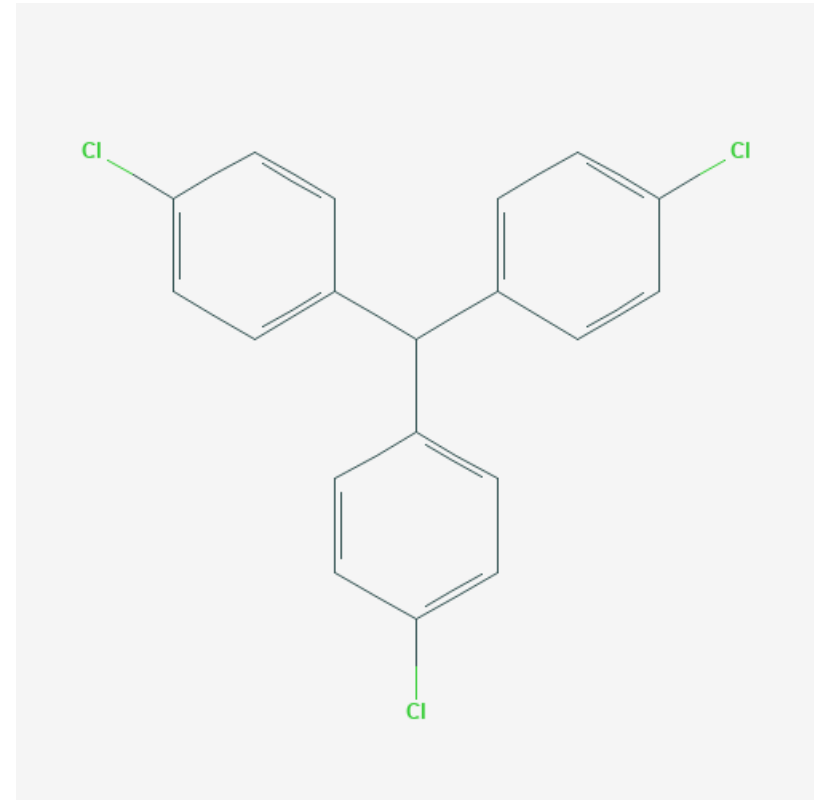


Average halogenated compounds in condor serum and blank samples (\pm SE)



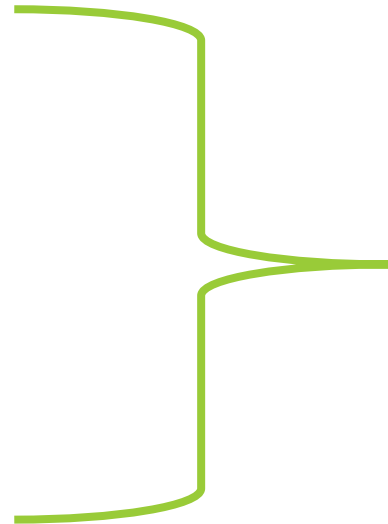
Contaminant of interest

- Tris(4-chlorophenyl)methane [TCPM]
- Specific to Southern California
- Present in:
 - 6 out of 7 coastal samples
 - 1 out of 10 inland samples



Natural contaminants

- MBP Cl-7
 - 7 out of 7 coastal samples
 - 0 out of 10 inland samples
- DMBP Br-4 Cl-2
 - 4 out of 7 coastal samples
 - 0 out of 10 inland samples



Both present in
Southern California
marine mammals

What's next?



- Compile and compare contaminant profiles in both condor groups
- Process marine mammal blubber samples



Thank you!

Funding support from
the California SeaGrant



Research support from:

San Diego State University

Dr. Eunha Hoh

Dr. Nathan Dodder

Jade Johnson

Jennifer Cossaboon



San Diego Zoo Global – Institute for
Conservation Research

Dr. Christopher Tubbs

Dr. Ignacio Vilchis

Rachel Felton

