

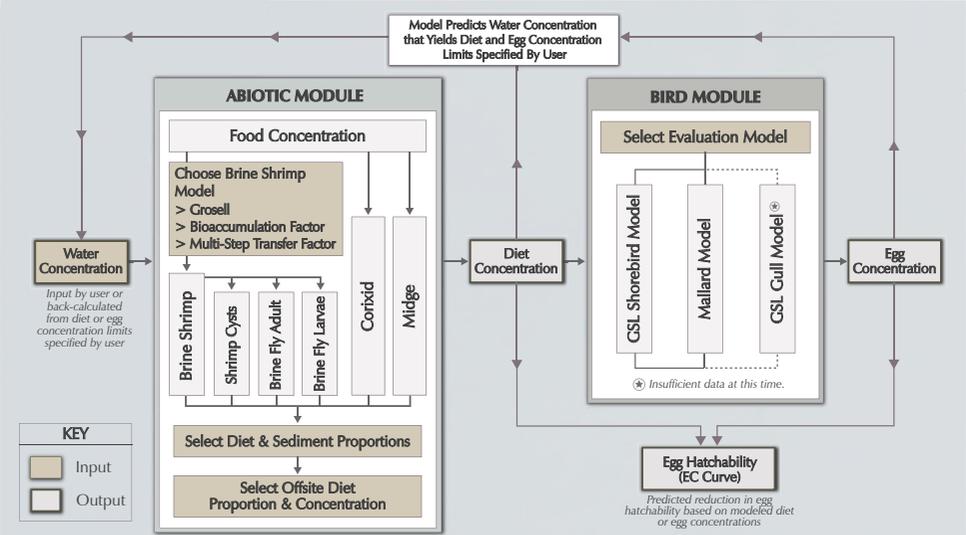
# Development of a Selenium Standard for the Open Waters of Great Salt Lake

## Great Salt Lake Water Quality Studies

### How do we relate waterborne to egg selenium concentrations?

- Data and observations from research projects were integrated into the Bioaccumulation Model
- Model includes mathematical relationships, or “transfer factors”, that define the pathway of selenium in the food web
- User may select water concentration to estimate the resulting diet and egg concentration, or vice versa

### Model Structure



Model Flowchart

### Bioaccumulation Model (Version 4.3)

Selenium Cycling in the Open Waters of the Great Salt Lake  
May 6, 2008

[CONTACT INFO](#)  
[MODEL FLOW CHT](#)  
[REFERENCES](#)

---

**Water Column Concentration ( $\mu\text{g Se/L}$ )**

Water column concentrations have been observed to vary historically between 0.40 and 0.86  $\mu\text{g Se/L}$ .

Please specify the water column concentration to estimate diet / egg conc. **0.60**

**Solve for the water concentration that yields:**

**Diet Limits**   [Solve for Shorebird](#)   [Solve for Gull](#)

**Egg Limits**   [Solve for Shorebird](#)   [Solve for Gull](#)

Use these buttons to display detailed calculation modules and other information:

[SHOW MB Inputs](#)   [HIDE MB Inputs](#)

[SHOW Abiotic Model](#)   [HIDE Abiotic Model](#)

[SHOW Bird Model](#)   [HIDE Bird Model](#)

**Resulting Tissue Concentrations of Diet Options ( $\mu\text{g Se/g dw}$ )**

Choose brine shrimp model:  Grosell Model    BAF    MS-TF

Please specify concentrations of diet options for each species

Diet Options	Concentration	Shorebird	Gull
Brine shrimp (adults)	3.90	0%	100%
Brine shrimp cysts	2.15	0%	0%
Brine fly adults	1.68	0%	0%
Brine fly larvae	1.25	100%	0%
Corixid	2.33	0%	0%
Midge	2.00	0%	0%
<b>Total Before Sediment</b>		<b>100%</b>	<b>100%</b>
Sediment	0.65	5%	0%
Phytoplankton (seston)	0.89		
<b>Total Onsite Diet Concentration</b>		<b>1.28</b>	<b>3.90</b>

Please specify offsite diet ratio and concentration

Offsite: **1.90**   **0%**   **0%**

**Limits and Modeled Diet Concentrations for Each Species ( $\mu\text{g Se/g dw}$ )**

	Shorebird	Gull
Limits for Diet Concentration	4.90	4.90
Modeled Diet Concentration	1.28	3.90

**Resulting Egg Concentrations and Indices for Each Species ( $\mu\text{g Se/g dw}$ )**

Please specify limits and which model to use to estimate Egg Concentration

GSL-specific Models    Mallard Model

	Shorebird	Gull
Limits for Egg Concentration	12.50	12.50
Modeled egg concentrations	2.53	2.71

### Model Results

If the water in GSL were at “x”  $\mu\text{g/L}$  what does the model predict the concentration of selenium would be in the egg?

Water $\mu\text{g/L}$ (ppb)	Bird Eggs $\text{mg/kg}$ (ppm)
0.6	2.5
1.0	4.3
2.0	8.8
3.0	13.3

ppb = parts per billion  
ppm = parts per million