



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

Great Salt Lake Water Quality Studies

---

## Assessment Framework

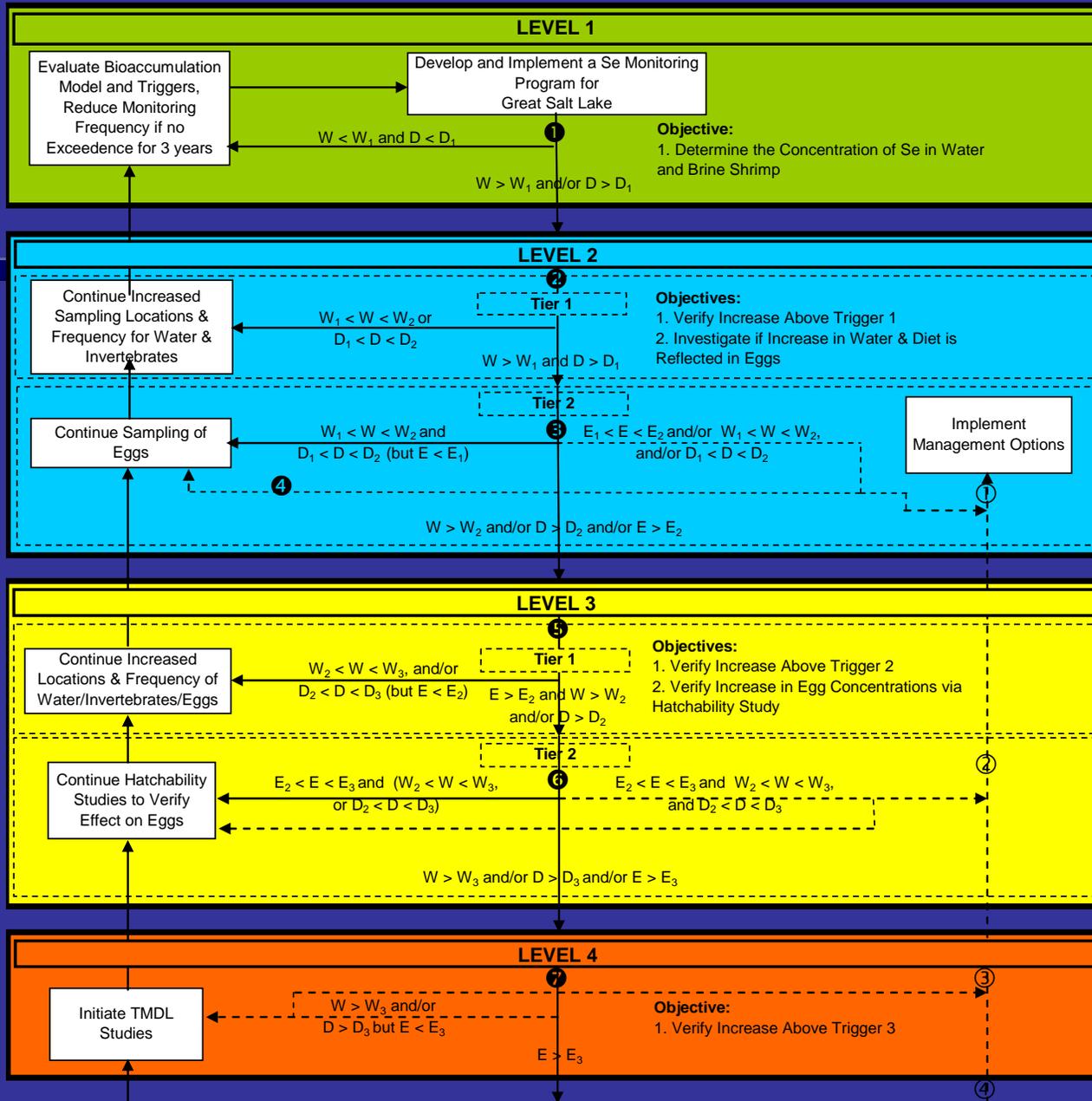
May 2, 2008



# Goals for Assessment Framework

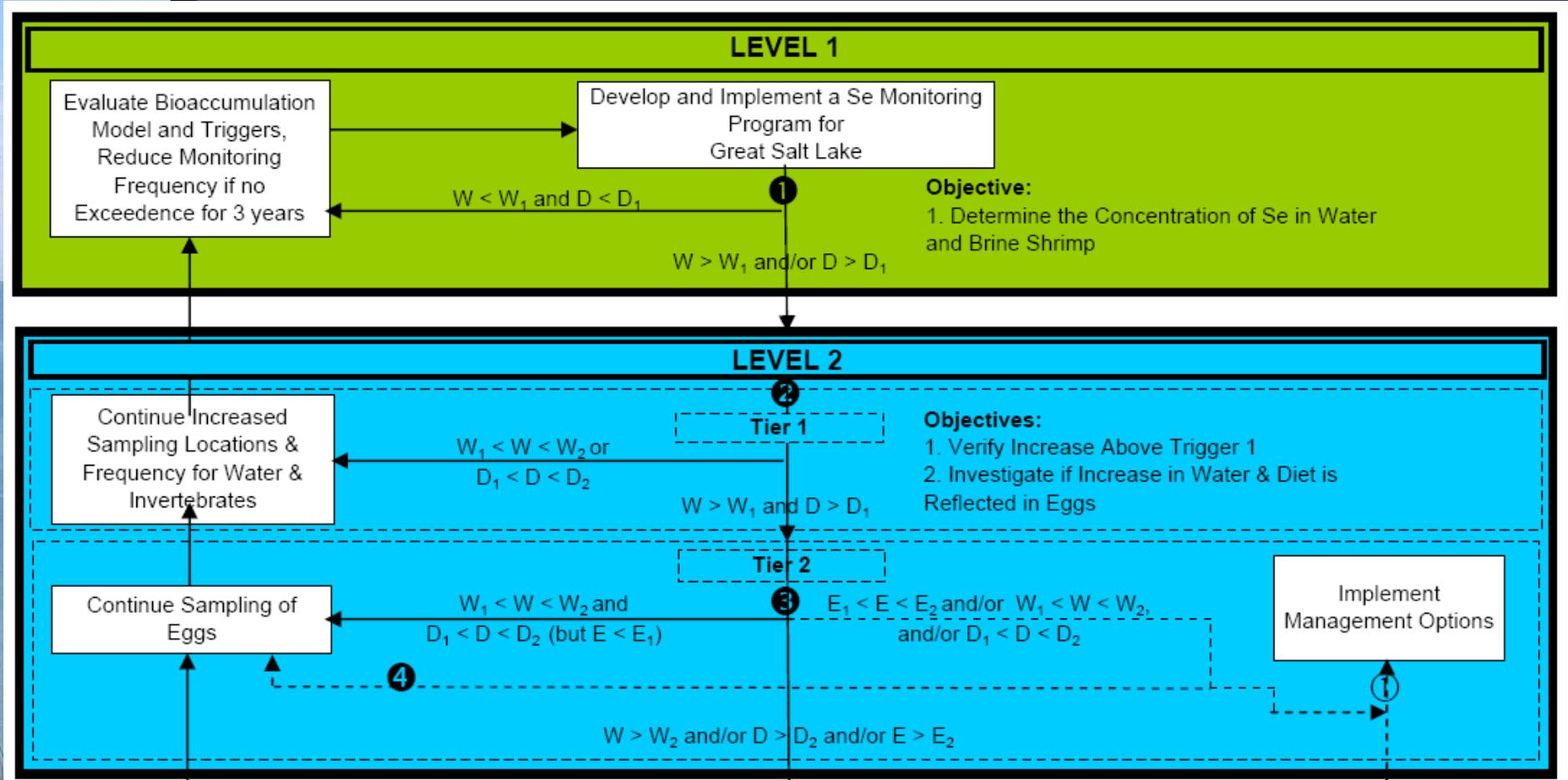
---

- **Prevent Se from exceeding water quality standard**
  - Monitor GSL Se levels to assess trends and identify exceedance of standard
  - Address uncertainty in relationships by validating and further developing understanding
  - Evaluate triggers and water quality standard, is an exceedance really from GSL?
  - Initiate steps to mitigate further increases in Se

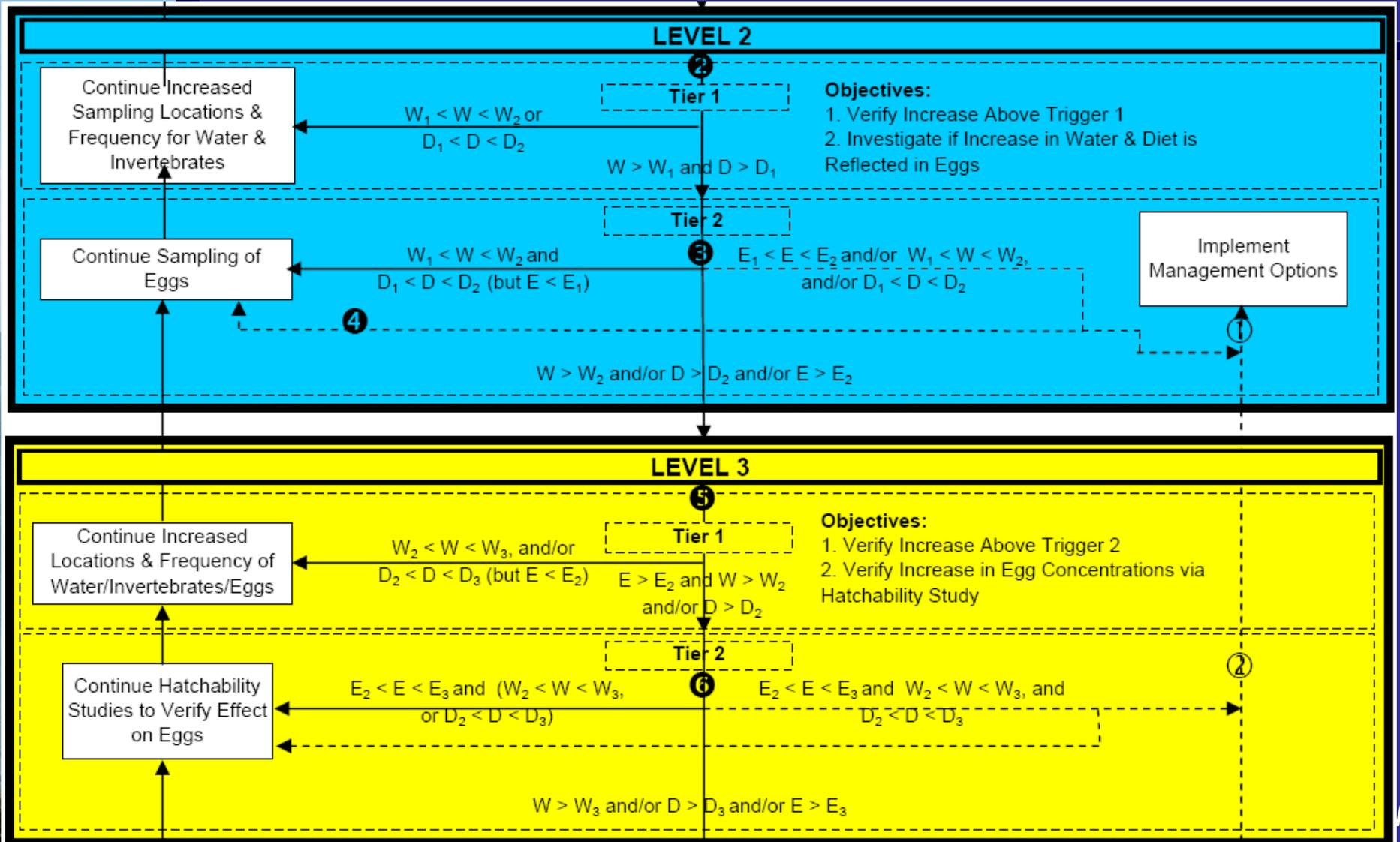


Great Salt Lake is listed on 303(d) list as impaired.

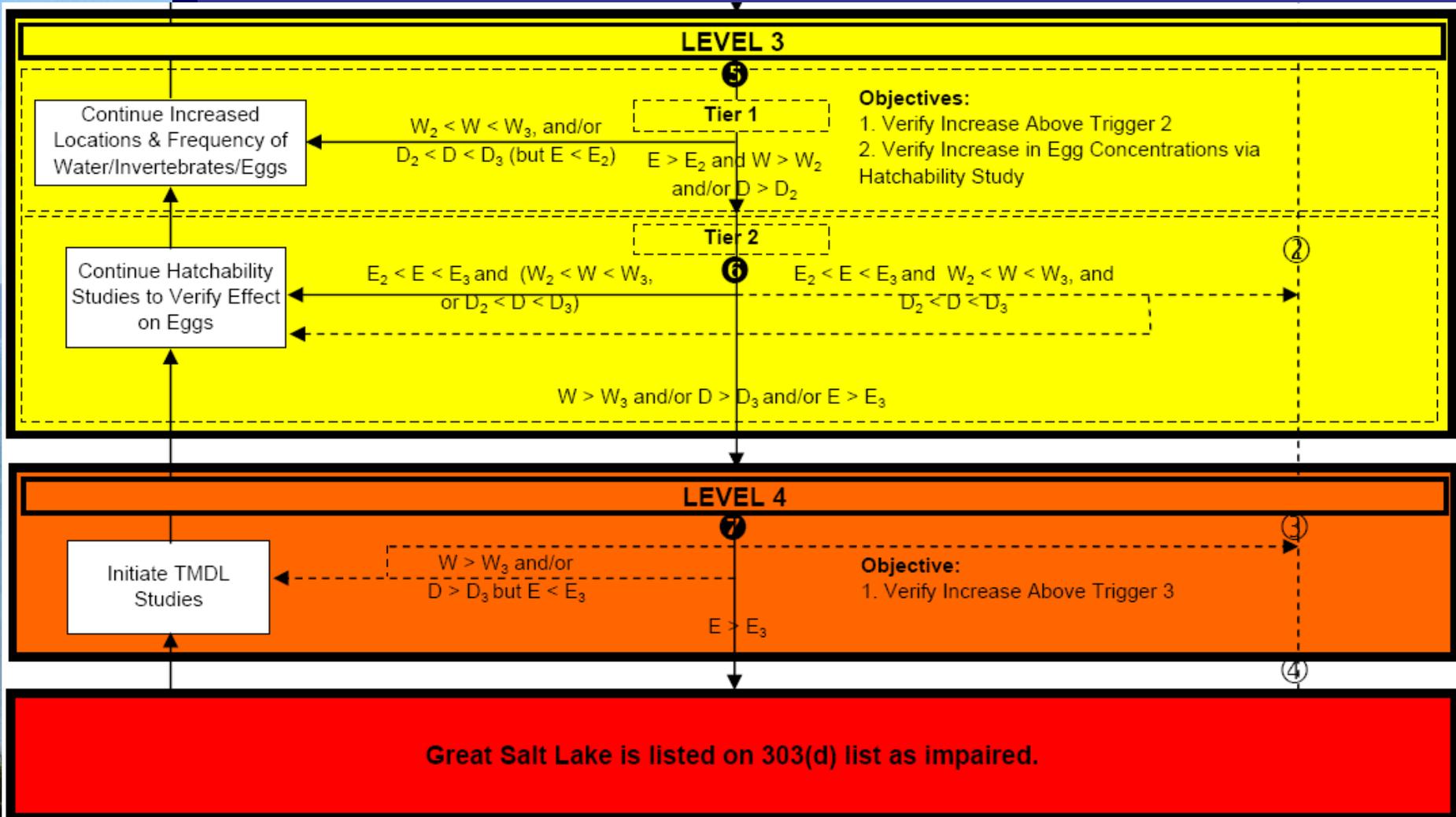
# Level 1 to Level 2



# Level 2 to Level 3



# Level 3 to Level 4 to Level 5



# Sampling, Assessment & Management

## Sampling Programs:

①	Sample water and brine shrimp at four locations semi-annually.		
②	Increase sampling of water and brine shrimp to eight locations on quarterly basis.		
③	Add sampling of eggs at two locations for two bird species on annual basis.		
④	Increase sampling of eggs to three locations for two bird species on annual basis.		
⑤	Increase sampling of water and brine shrimp to eight locations on monthly basis, eggs at three locations for two bird species on annual basis.		
⑥	Add completion of hatchability study for one bird species on annual basis.		
⑦	Expand hatchability study to two bird species on annual basis.		

## Management Options

①	Require Antidegradation Review Level II for all new discharges.		
②	Implement caps on Se loads from existing point discharges.		
③	Initiate preliminary studies for load reductions		
④	Implement load reduction and declare impairment.		

## Definitions

W <sub>1</sub> : Trigger 1 for water concentration	W <sub>2</sub> : Trigger 2 for water concentration	W <sub>3</sub> : Trigger 3 for water concentration
D <sub>1</sub> : Trigger 1 for diet concentration	D <sub>2</sub> : Trigger 2 for diet concentration	D <sub>3</sub> : Trigger 3 for diet concentration
E <sub>1</sub> : Trigger 1 for egg concentration	E <sub>2</sub> : Trigger 2 for egg concentration	E <sub>3</sub> : Trigger 3 for egg concentration

Trigger 3 represents the site-specific numeric water quality standard; this may be a water or tissue-based concentration.

# Scenarios for Trigger Levels

## Scenarios for Consideration ALL VALUES LISTED IN SCENARIOS FOR CONSIDERATION ARE SUBJECT TO CHANGE BY SCIENCE PANEL.

Scenario No.	Matrix	Conc. Units	Trigger 1		Trigger 2		Trigger 3		Remarks
			Conc.	EC	Conc	EC	Conc	EC	
1	Water	ppb							Uses LCL for EC <sub>10</sub> as trigger for impairment and background level for initial action.
	Diet	ppm							
	Egg	ppm	3	Bckgrnd	4.7		6.4	EC <sub>1.5</sub>	
2	Water	ppb							Uses EC <sub>10</sub> as trigger for impairment and background level for initial action.
	Diet	ppm							
	Egg	ppm	3	Bckgrnd	6.4	EC <sub>1.5</sub>	12	EC <sub>10</sub>	
3	Water	ppb							Uses EC <sub>10</sub> as trigger for impairment and LCL for EC <sub>10</sub> for initial action.
	Diet	ppm							
	Egg	ppm	6.4	EC <sub>1.5</sub>	9.2	EC <sub>5</sub>	12	EC <sub>10</sub>	
4	Water	ppb							Uses UCL for EC <sub>10</sub> as trigger for impairment and LCL for EC <sub>10</sub> for initial action.
	Diet	ppm							
	Egg	ppm	6.4	EC <sub>1.5</sub>	12	EC <sub>10</sub>	16	EC <sub>21</sub>	

Note:

1. These scenarios are offered for consideration. Trigger 3 to be determined by water quality standard.
2. EC values determined from Ohlendorf 2003.
3. Egg concentration of 3ppm used as background level of Se (Skorupa & Ohlendorf 1991).