Appendix F

Draft Hydrologic Modeling of the Pacific Institute Salton Sea Restoration Concept

Pacific Institute Impoundment Proposal

Paul A. Weghorst, PE
Bureau of Reclamation
January 8, 2002

Purpose

- *Characterize hydrologic conditions*

  – **Main Sea**
  – **South Impoundment**
  – **North Impoundment**

(Both impoundments evaluated with dikes constructed at –245 feet)

General Modeling Assumptions

- *Reductions in inflow will occur*
  – **Start at baseline = 1.24 maf/yr**
  – **Future inflow = 1.00 maf/yr**
    - Approximates possible reductions from water transfers
    - Consistent with evaluation of other restoration alternatives
- *Simulation Period: 2000 to 2074*
- *Dike Construction*

  – **Constructed In Water**
  – **Dikes Closed in 2007**

Sediment Load Assumptions

- *Sediment Load Rate = 0.53 tons/af*

  – **From Draft Report:**

  - Sedimentation / Siltation Total Maximum Daily Load for the Alamo River

    – **Assumed same for New, Alamo, and Whitewater Rivers**
- *Sediment Density = 1.2 tons/yd^3*
- *Impoundment trap rate = 100 percent*

Nutrient Load Assumptions

- *Nutrient Loading for 1999 [1] Prorated According to Annual Inflows*
  – **Total N**
  – **Total P**

---

[1] Source: Setmire, Jim et al., 2001. Eutrophic Conditions at the Salton Sea. A Topical Paper From the Eutrophication Workshop Convened at the University of California at Riverside, Sept. 7-8, 2000.

Wetlands Assumptions

- *Water Losses = 0.8 * Pan Evaporation [1]*
- *Surface Area Requirements*
  – **Based on Imperial Wetlands**
    Requirement = 0.012 acres/af
- *Sediment Removal = 90 Percent [2]*

- *Nutrient Removal* [3/]
  - **Total N Removed = 34 %**
  - **Total P Removed = 11 %**

1/ Source: Kadlec, R.H., and R.L. Knight. 1996 Treatment Wetlands. Lewis Publishers, Boca Raton, FL.
2/ General observation of data collected at Imperial and Alamo Wetlands
*3/ Personal communication from Jim Sartoris, USGS, Mid-continent Ecological Science Center – unpublished data*
Main Sea Simulation Simulation Results

(Based on Application of the Bureau of Reclamation's Salton Sea Accounting Model)

**Main Sea Salinity
Pacific Institute Proposal**
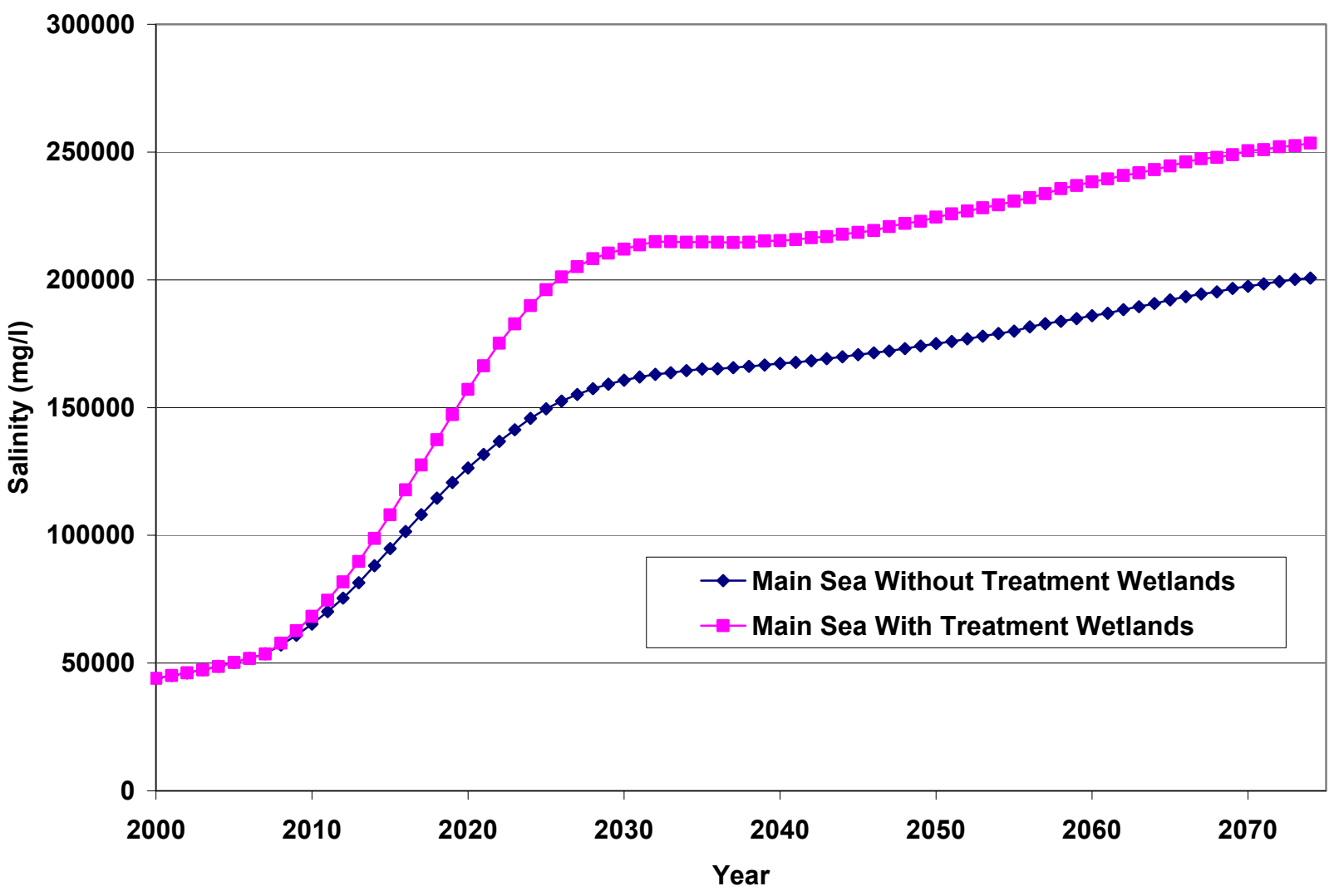
Main Sea Water Surface Elevation

Main Sea Water Surface Elevation
Pacific Institute Proposal

Main Sea Surface Area

Main Sea Surface Area
Pacific Institute Proposal
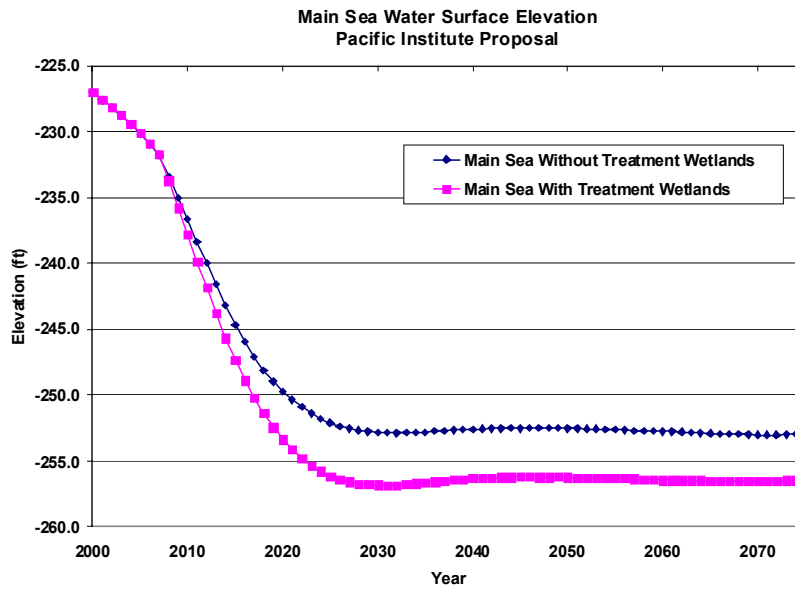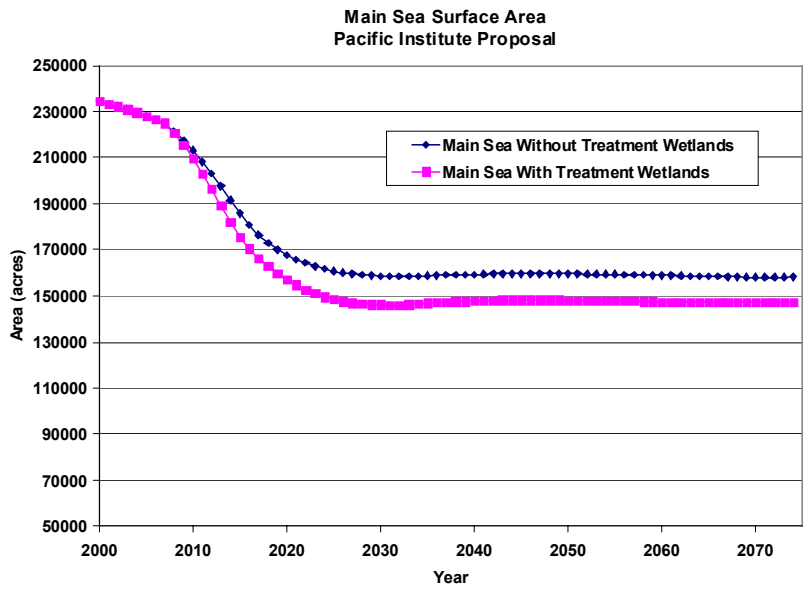
South Impoundment Simulation Results

Wetlands Surface Area Requirements
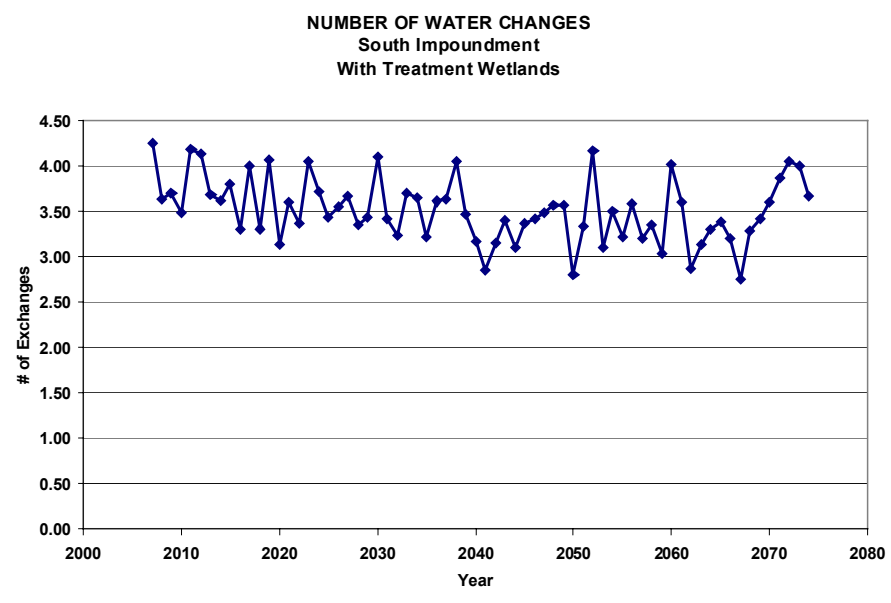
TREATMENT WETLANDS SURFACE AREA
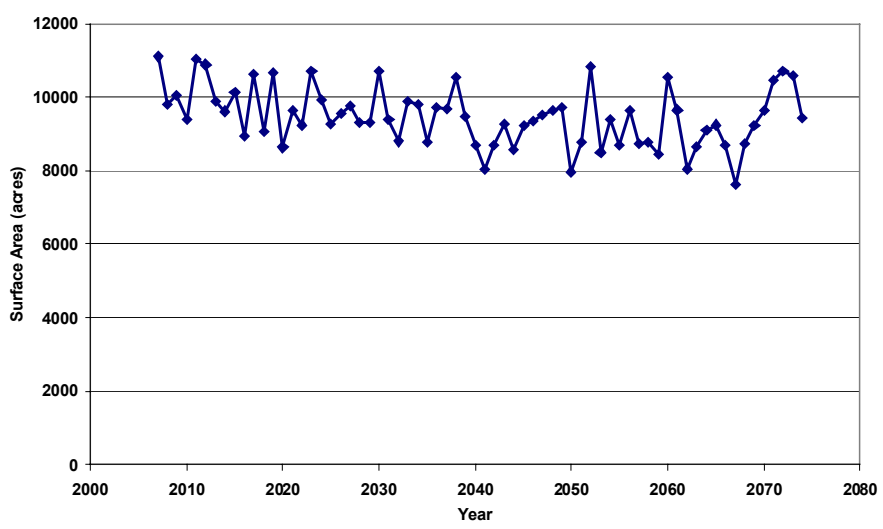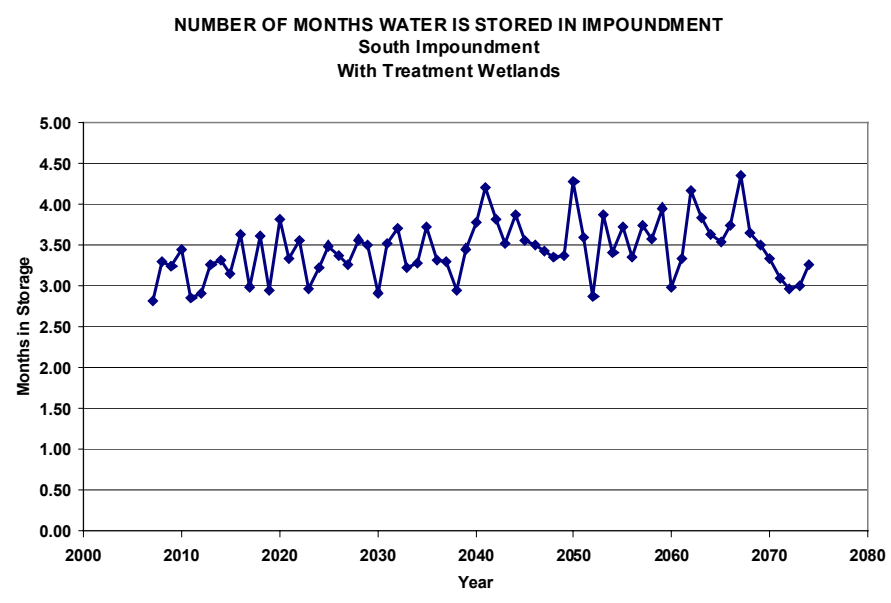

Inflows/Outflows: South Impoundment

AVERAGE ANNUAL INFLOWS and OUTFLOWS
South Impoundment
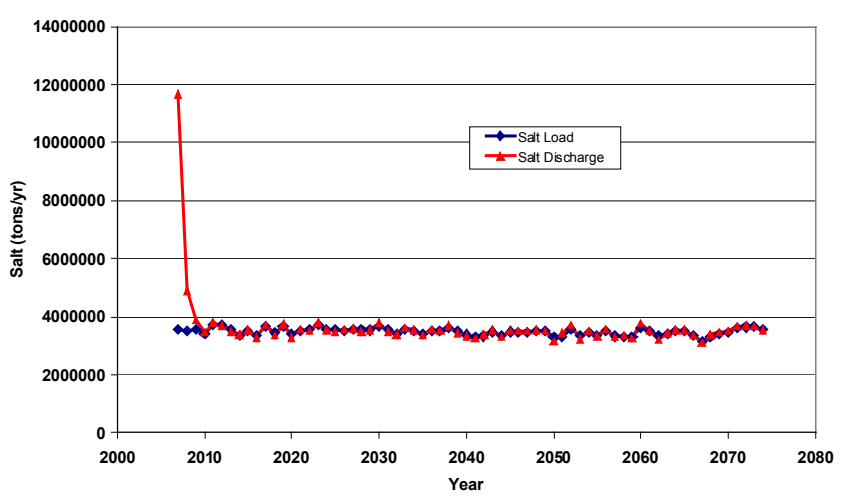**With Treatment Wetlands**
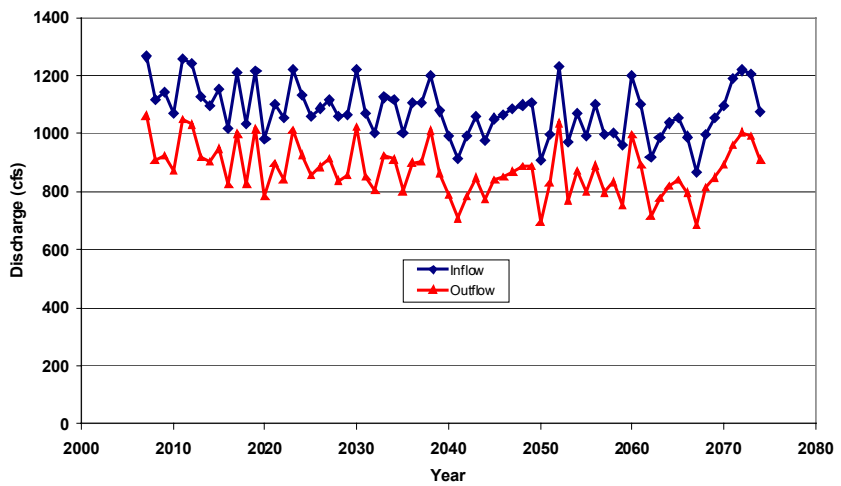
Water Exchanges: South Impoundment

NUMBER OF WATER CHANGES
South Impoundment
With Treatment Wetlands

Months in Storage:South Impoundment

NUMBER OF MONTHS WATER IS STORED IN IMPOUNDMENT
South Impoundment
With Treatment Wetlands

Salt Load and Discharge: S. Impound.

SALT LOAD AND DISCHARGE
South Impoundment
With Treatment Wetlands

Salinity: South Impoundment
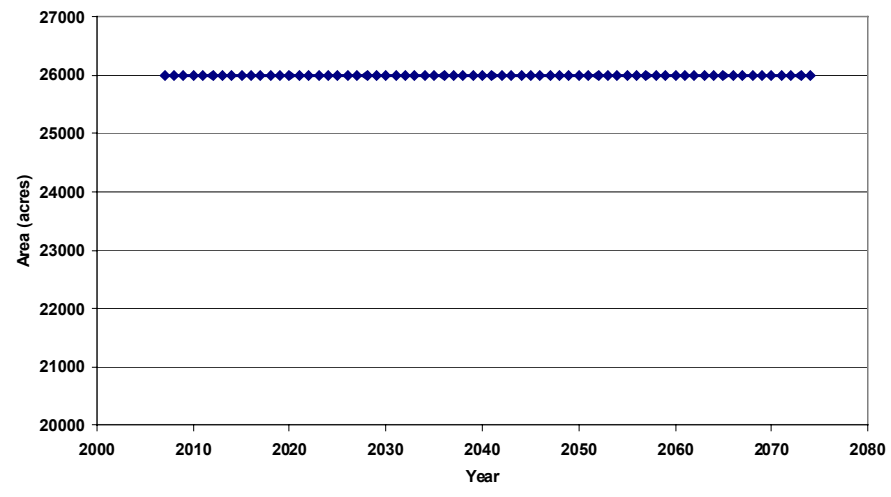
ANNUAL ENDING SALINITY
South Impoundment
With Treatment Wetlands
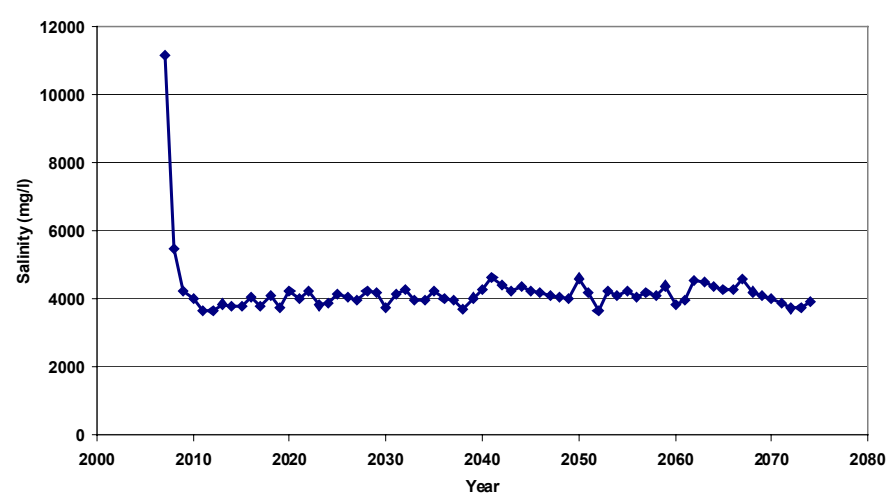
Elevation: South Impoundment

ANNUAL ENDING ELEVATION
South Impoundment
With Treatment Wetlands
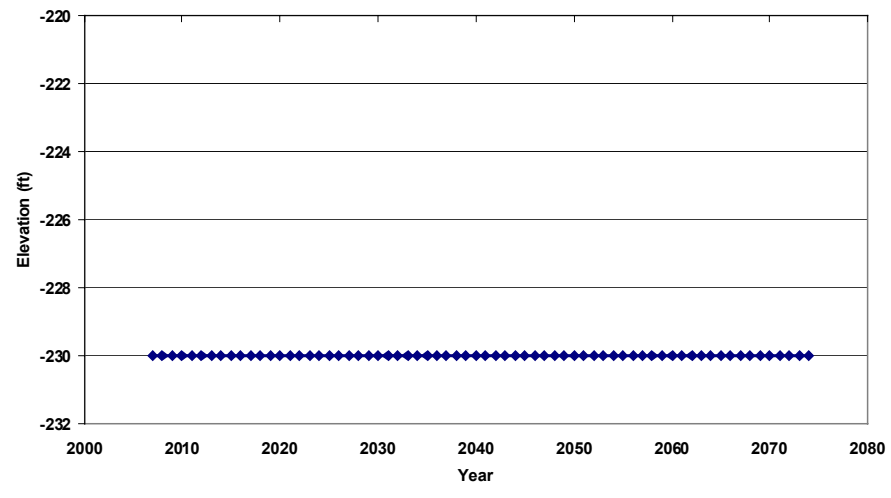
Surface Area: South Impoundment

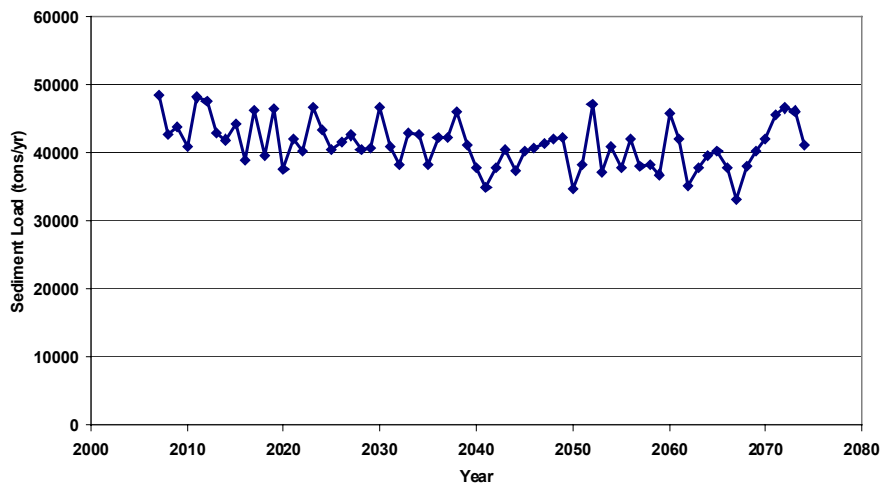**ANNUAL ENDING SURFACE AREA**
South Impoundment
With Treatment Wetlands

Nutrient Load: South Impoundment

NUTRIENT LOADING FROM RIVERS
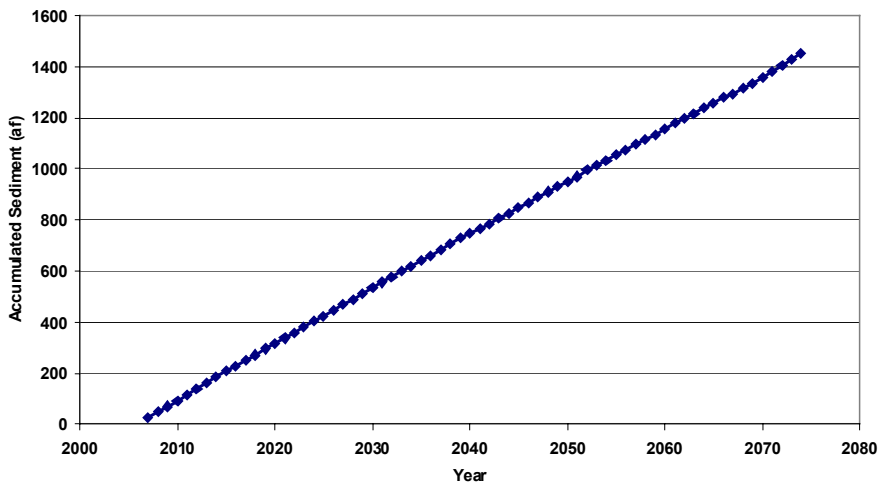**South Impoundment**
With Treatment Wetlands
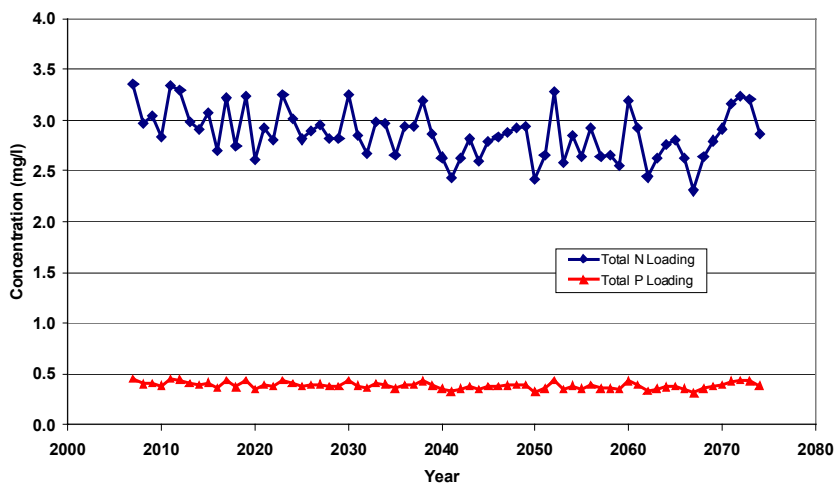
Sediment Load: South Impoundment

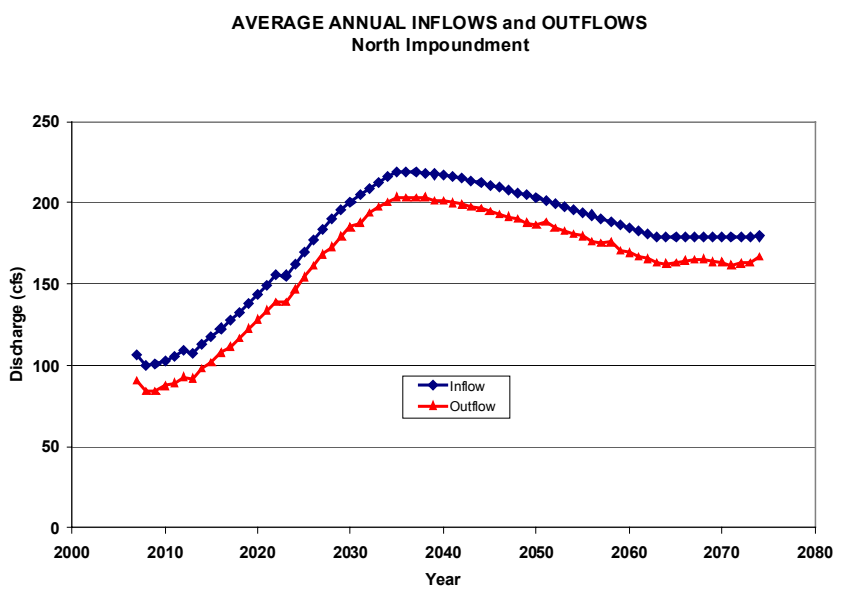**SEDIMENT LOAD**
South Impoundment
With Treatment Wetlands

Sediment Trapped: S. Impoundment

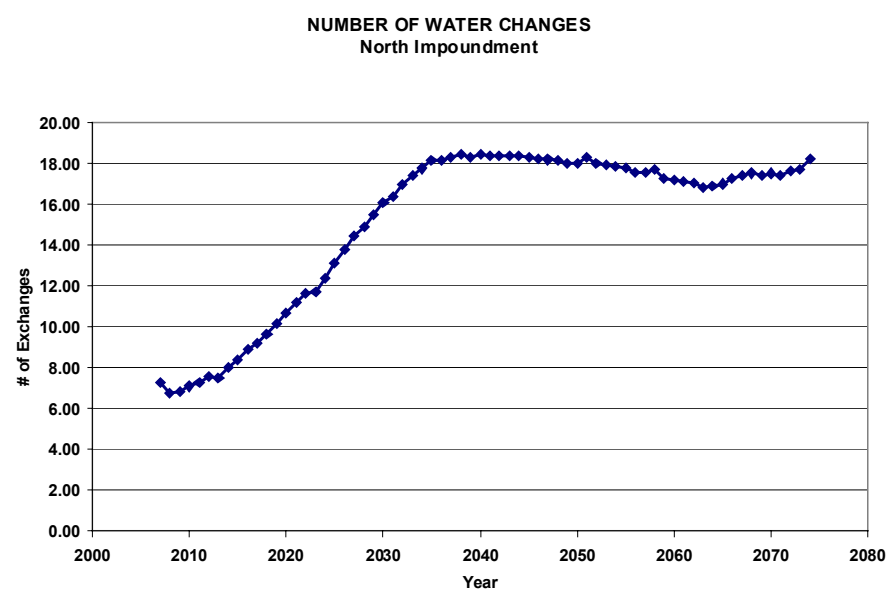**ACCUMULATED SEDIMENT**
South Impoundment
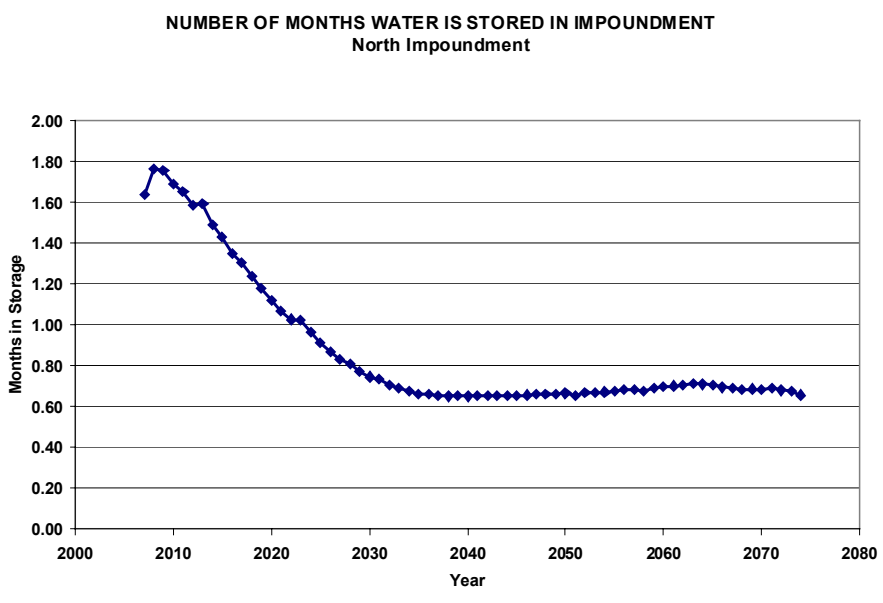**With Treatment Wetlands**

# North Impoundment Simulation Results

Inflows/Outflows: North Impoundment

AVERAGE ANNUAL INFLOWS and OUTFLOWS
North Impoundment

Water Exchanges: North Impoundment

NUMBER OF WATER CHANGES
North Impoundment

Months in Storage:North Impoundment

NUMBER OF MONTHS WATER IS STORED IN IMPOUNDMENT
North Impoundment

Salt Load and Discharge: N. Impound.

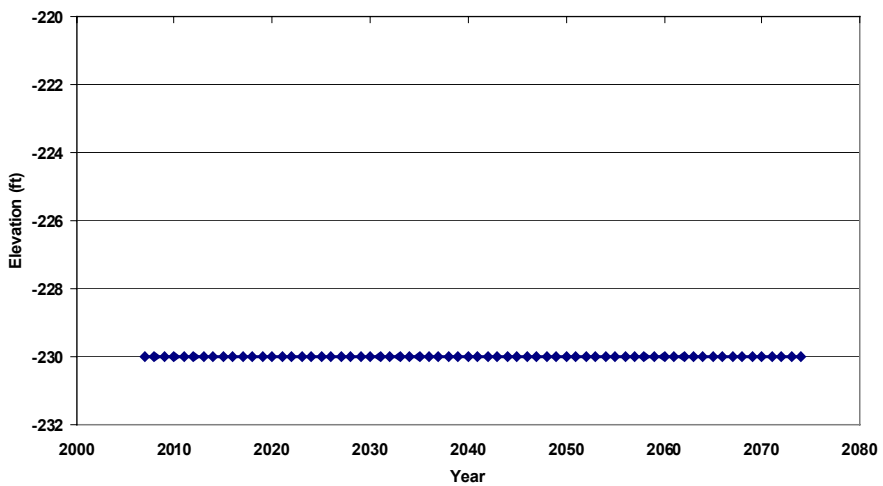**SALT LOAD AND DISCHARGE**
North Impoundment
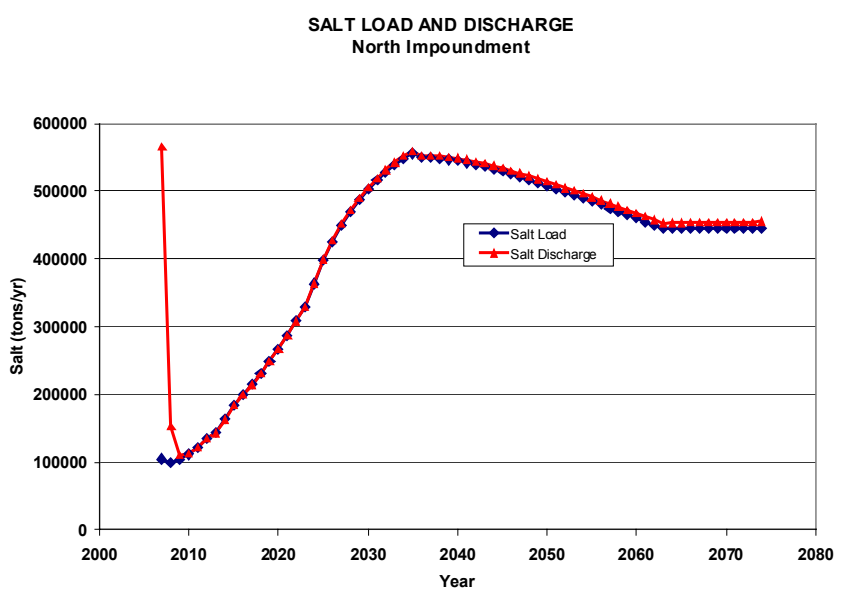
Salinity: North Impoundment

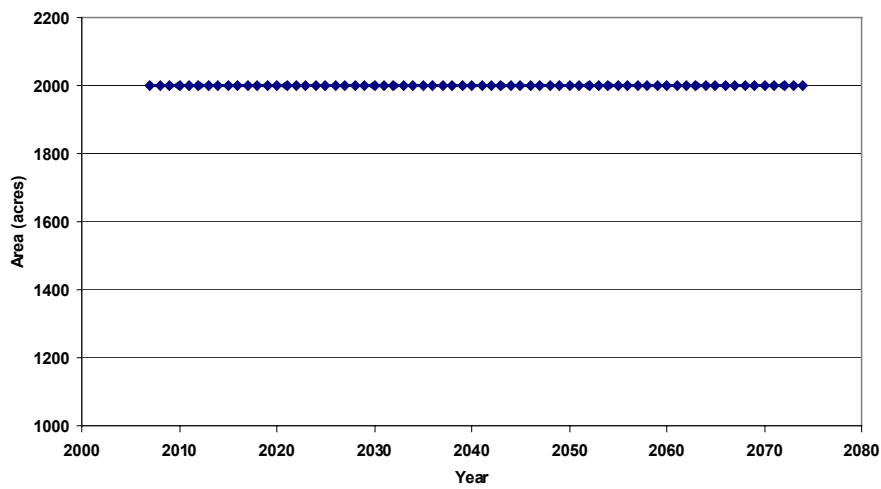**ANNUAL ENDING SALINITY**
North Impoundment
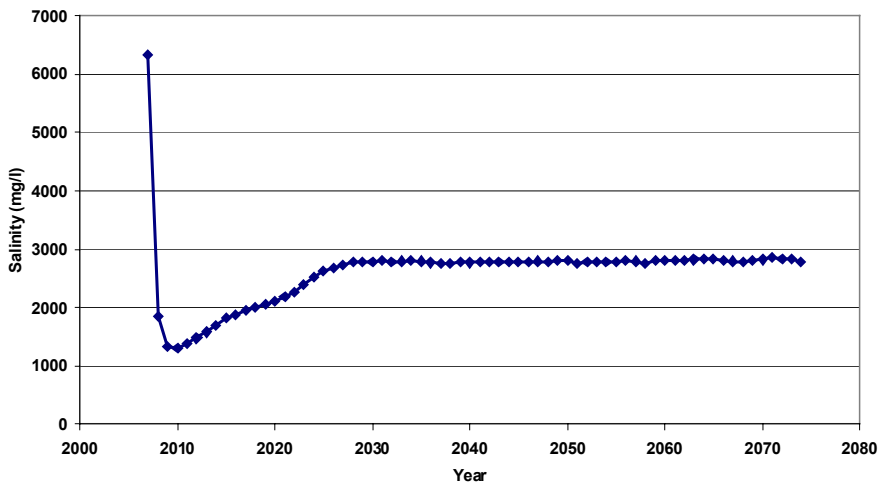
Elevation: North Impoundment
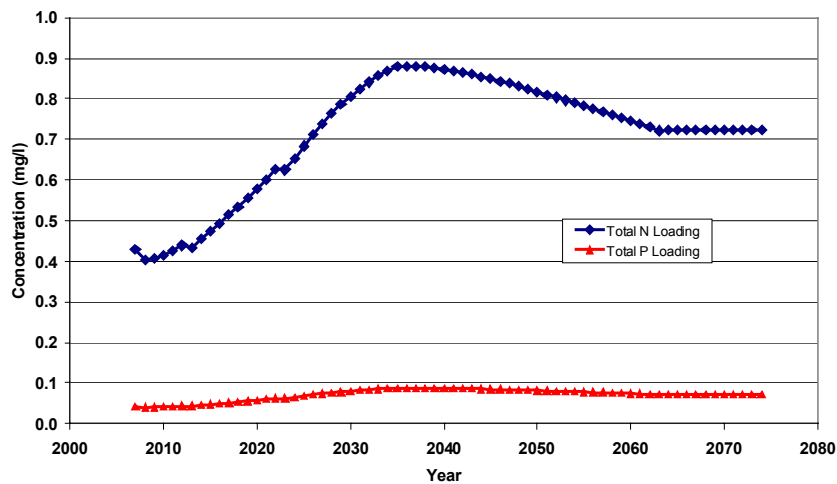
ANNUAL ENDING ELEVATION
North Impoundment

Surface Area: North Impoundment

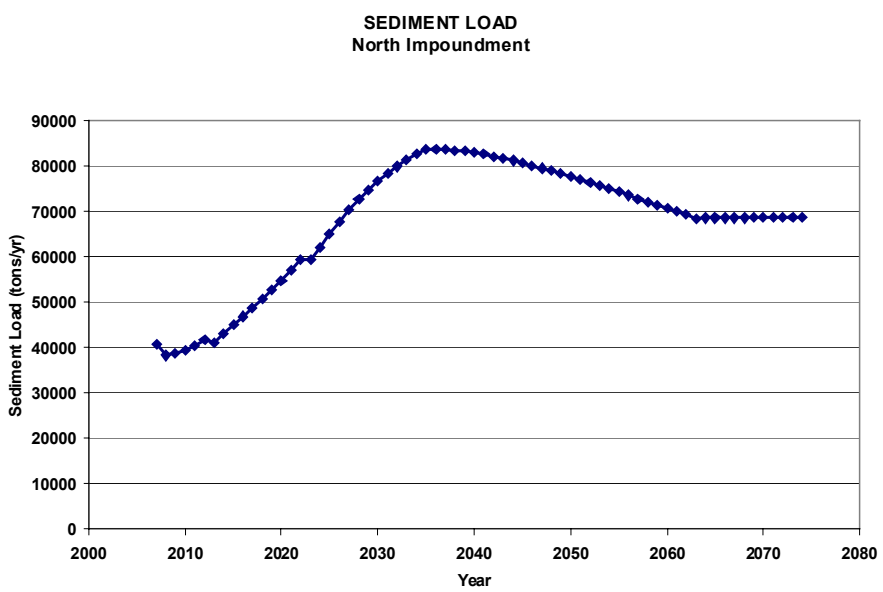**ANNUAL ENDING SURFACE AREA**
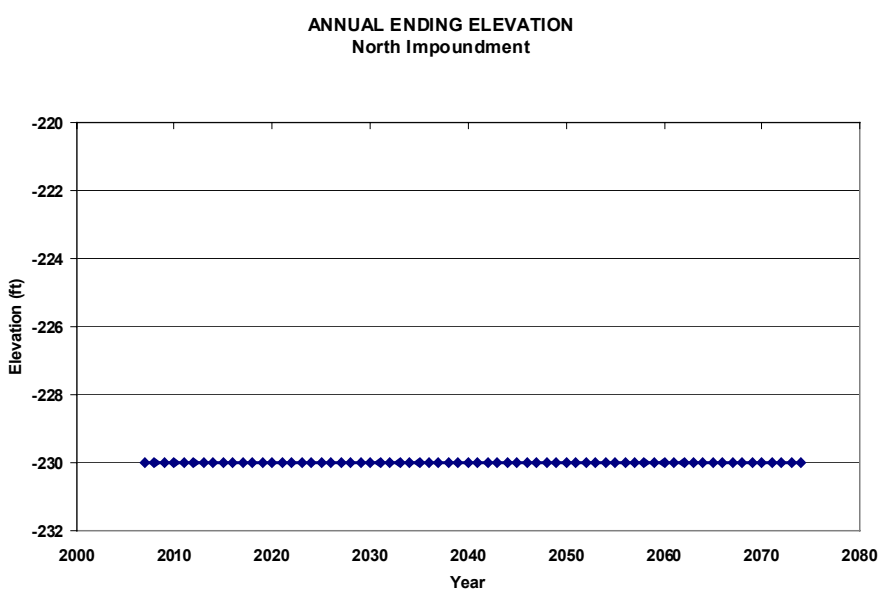**North Impoundment**

Nutrient Load: North Impoundment

NUTRIENT LOADING FROM RIVERS
North Impoundment

Sediment Load: North Impoundment

SEDIMENT LOAD
North Impoundment

Elevation: North Impoundment
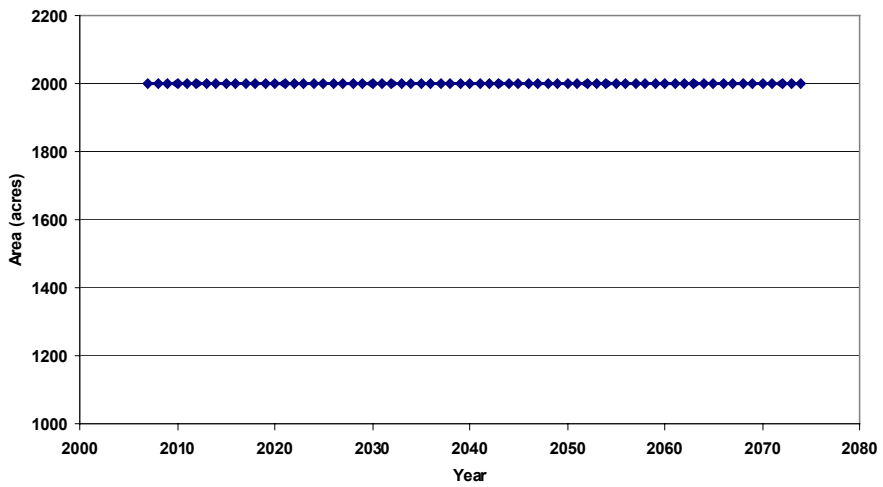
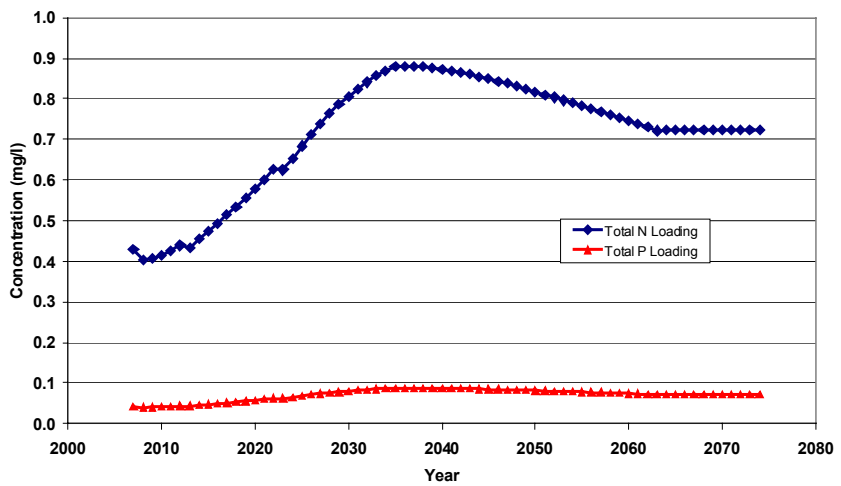**ANNUAL ENDING ELEVATION**
North Impoundment

Surface Area: North Impoundment

ANNUAL ENDING SURFACE AREA
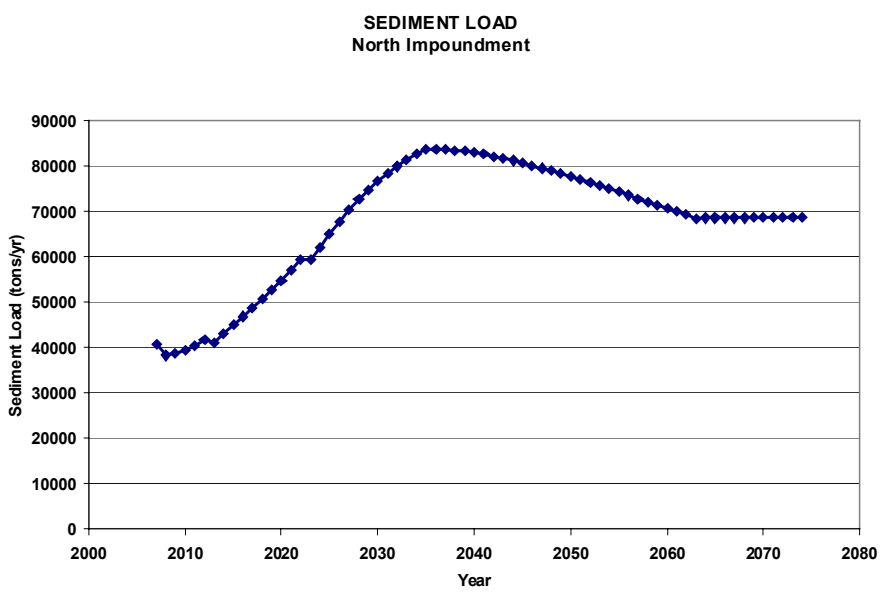**North Impoundment**

Nutrient Load: North Impoundment

NUTRIENT LOADING FROM RIVERS
North Impoundment

Sediment Load: North Impoundment

Sediment Trapped: N. Impoundment