

South Rivanna Reservoir



South Rivanna Reservoir

- A long narrow water body with a very large watershed giving it the characteristics of both a river and a lake;
- Provides the community recreational benefits, a unique aquatic environment along with a consistent supply of water;
- Reservoir is characteristic to other Piedmont reservoirs with similar land uses;
- Has aesthetic positives yet not environmentally pristine.

Water Quality

- Adequate to maintain 100% compliance with drinking water regulations after treatment, yet not pristine.
- Reservoir has elevated nutrient levels that can lead to algae blooms, poor light transmission, low dissolved oxygen (warm months); reservoir on DEQ's **Naturally Impaired List for Dissolved Oxygen** (Presently proposed to be delisted).
- Warm months requires aggressive treatment to remove taste & odor compounds (algae, manganese, iron, low dissolved oxygen) from the raw drinking water.
- Water quality typical of other reservoirs with similar watersheds (land use).

Warm Months Algae Community

- Average for May 2006 (cells per mL)

Blue-green algae: **1691**; Non Blue-green: 3318

- Average for August 2006

Blue-green algae: **86,410**; Non Blue-green: 7617

- Average for May 2007

Blue-green algae: **998**; Non Blue-green: ND

- Average for August 2007

Blue-green algae: **77,397**; Non Blue-green: 1052

- Average for May 2008

Blue-green algae: **441**; Non Blue-green: 930

- Average for August 2008

Blue-green algae: **101,668**; Non Blue-green: 2187

Algae Facts

Species of blue-green algae may dominate and increase excessively when:

- Nutrient levels, particularly phosphorus and nitrogen are sufficient to support growth;
- Water is still or turbulence is minimal;
- Weather pattern is stable for a long time;
- Weather is warm (although blooms can occur in cooler weather).

Water Quality

- Sediment accumulation and oxidation status can impact water column chemistry;
- Raw water quality to treatment plant is directly impacted by wet-weather events that cause increased flow into and thru the water body. For example: dry weather raw water turbidities can range from 2 to 5 turbidity units versus wet weather turbidities ranging from 10 to 89 TUs.

Biology

- Little is known about the reservoir's benthic invertebrate population;
- Warm water fish are the norm, turtles (sliders) and aquatic mammals (beaver/muskrats) widely found;
- In the upper reaches aquatic plant species such as Elodea present and the freshwater jellyfish (Craspedacusta) have been reported;
- Elodea favors waters rich in silty sediments and nutrients;
- Fringe wetlands widely developed along edge of water body.

Sediment

Sediment Chemistry

- Limited information about presence/absence of heavy metals;
- Little is known about presence/absence of pesticides/herbicides/PCBs;
- DEQ water column pesticide data appear Non Detect
- Little is known about presence/absence of trace organics.
- **All RWSA finished drinking water sample testing for the above compounds/elements are in 100% compliance with the USEPA's Safe Drinking Water Act regulatory requirements.**

Sediment Chemistry

- Five sediment samples have been collected:
 - Two core samples by DEQ in September 1996;
 - Three core samples by F&R (for RWSA) in November 2002.

DATA FROM SEDIMENT SAMPLES

DEQ: Collected September 1996 -Two samples

Arsenic: Non-Detect at 5 ppm

Zinc: 132/136 ppm

Nickel: 16/17 ppm

Lead: 24/25 ppm

Mercury: Non-Detect at 0.3 ppm

Copper: 22/29 ppm

Chromium: 25/26 ppm

DATA FROM SEDIMENT SAMPLES

Collected by F&R for RWSA on November 13, 2002

<u>Sample No.</u>	<u>1</u>	<u>2</u>	<u>3</u>
% Sand	98.3	26.5	33.6
% Silt/Clay	1.7	73.5	66.4
Arsenic (ppm)	ND	23	ND
Barium (ppm)	61	231	67
Cadmium (ppm)	2	8	2
Chromium (ppm)	10	27	10
Lead (ppm)	17	48	11
Mercury	ND	ND	ND
Selenium (ppm)	ND	37	ND
Silver	ND	ND	ND
EOX (ppm)	10.3	ND	11.2

Sediment Make-up

- Limited knowledge on gravel/sand/clay/silt: sediment types, amounts and specific locations;
- Lack of knowledge on sediment organic make up (potential odor source) and inorganic grain sizes;
- Lack of analytical knowledge on sediment constituents (organic/inorganic) and their potential leachability.

Past Bathymetric Investigations

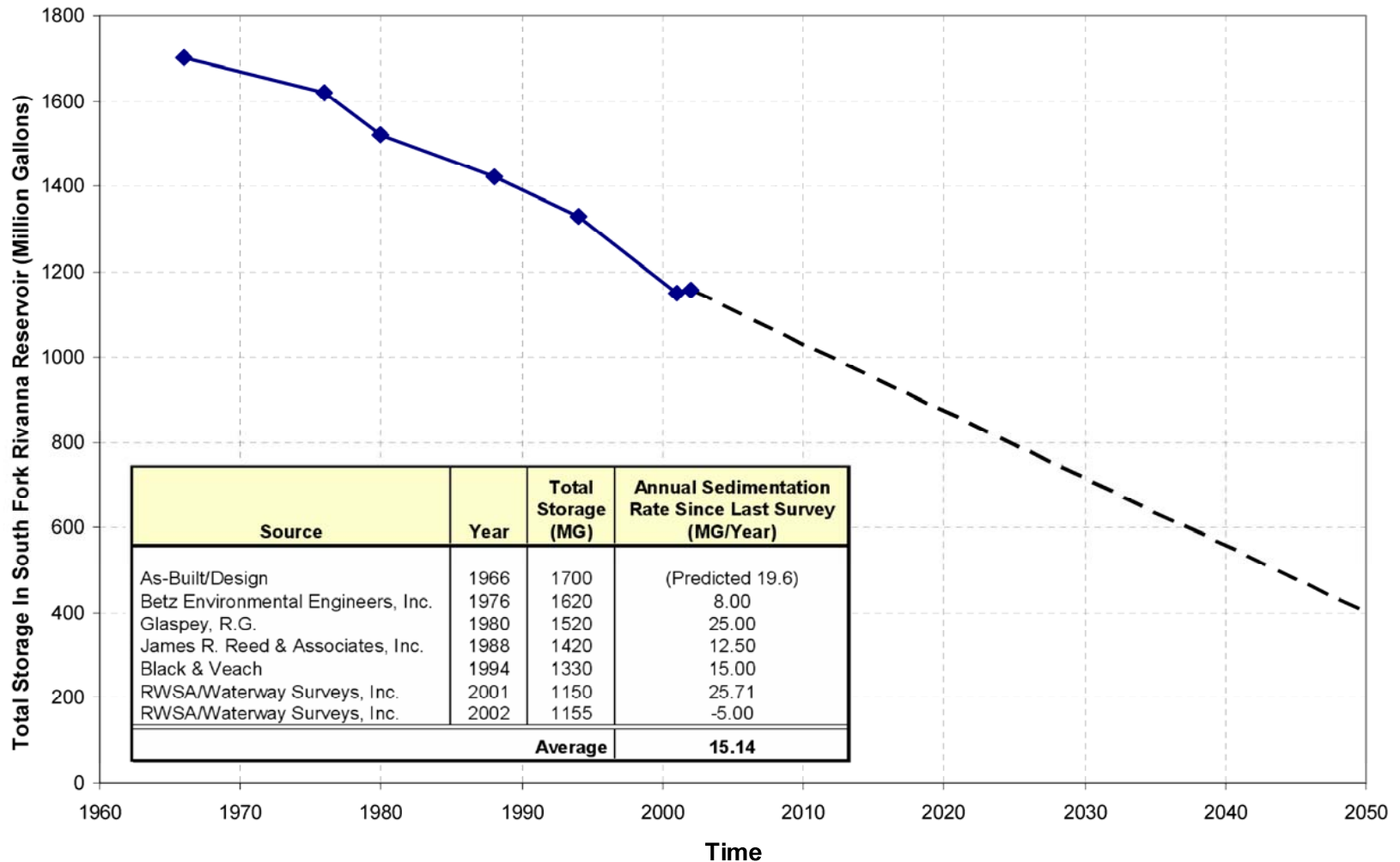


Figure 1. Plot Showing Change In Total Storage Over Time Due to Sedimentation at South Fork Rivanna Reservoir