Howard T. Odum
FLORIDA SPRINGS INSTITUTE

23695 W US HWY 27
HIGH SPRINGS, FL 32643
386.454.2427
386.454.9369 (FAX)

October 19, 2016

Melissa Gulvin
Government Affairs Program Manager
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899

Transmitted via email to Melissa.Gulvin@swfwmd.state.fl.us

Subject: Florida Springs Institute Comments on Recommended Minimum Flow for the Rainbow River System Peer Review Draft

Dear Melissa:

The Howard T. Odum Florida Springs Institute is a private, non-profit, scientific and educational organization dedicated to the better understanding and wise management of Florida's artesian springs. The Florida Springs Institute is actively involved in conducting springs baseline assessments and in providing science-based recommendations for springs restoration and protection. In this role, the Florida Springs Institute reviews all draft agency actions related to Florida's springs, including the development and implementation of minimum flows and levels.

As required by Florida statutes, protection of Florida's natural water bodies, including artesian springs, is the responsibility of the state's water management districts (WMDs). This oversight requires that your agency first and foremost protect the public trust by preserving the natural structure and function of water bodies, including the Rainbow Springs System. The Rainbow Springs and River has several special designations that establish a very high bar for protection. The Rainbow Springs System is a Florida Class III water body, requiring maintenance of fishable and swimmable conditions and compliance with more than 40 water quality criteria. Rainbow is also a Florida State Park, the "Real Florida"; an Outstanding Florida Water that is protected from any human activity that will cause degradation of water quality compared to conditions in the 1980s; a Surface Water Improvement and Management (SWIM) water body requiring restoration of impaired water

quality and habitat; an Aquatic Preserve to be restored and protected for the enjoyment of future generations; and a National Natural Landmark, with ecological significance to the entire United States. These protections represent a public mandate for the Southwest Florida WMD to provide the highest level of protection to the natural ecological health of Rainbow Springs and the Rainbow River.

In spite of these special designations, the Rainbow River System is currently the most polluted first-magnitude spring in the Southwest Florida WMD with an average concentration of 2.6 mg/L of nitrate nitrogen, and has a 15% average flow reduction over the past two decades compared to the earlier period-of-record. Excessive in-water recreation results in an additional significant stress on the Rainbow River System.

Ecological research conducted at the Rainbow River System over the past decade has found that the environmental health of the ecosystem is impaired, with expansive blooms of filamentous algae, reduced levels of photosynthetic efficiency, smaller populations of fish and other wildlife, loss of aesthetics due to compromised water clarity, and isolation from the marine fauna that formerly inhabited and enhanced the springs' ecological functions. The Florida Springs Institute recently provided a quantitative ecosystem assessment of the health of the Rainbow System in a report card format (attached document). The Rainbow System received an overall grade of C- with failing grades for Spring Discharge, Nitrate-Nitrogen, and Fish Biomass.

THE CONCLUSION FROM THE ABOVE SUMMARY IS THAT THE RAINBOW SYSTEM CANNOT TOLERATE AND SHOULD NOT BE SUBJECTED TO ANY ADDITIONAL ANTHROPOGENIC IMPACTS.

The WMD's proposal to allow an additional flow reduction of up to 7% is in direct conflict with the hard facts that the Rainbow River system is impaired; is not receiving statutory protections as intended by the Florida Legislature; and should be placed in recovery to restore some or all of its historic flows. The WMD has an undeniable mandate to reduce groundwater pumping to help reverse the significant harm caused by lowered spring flows.

The Southwest Florida WMD's Northern District Model v.5 has estimated that the Rainbow River spring flow has declined by only 1% as a result of consumptive uses. This result is suspect since actual flow data reported above and the three empirical water balances presented by the WMD to the Peer Review panel show that current pumping has already reduced spring flows within a range of 3 to 7%. The Florida Springs Institute has concluded that about one half of the observed 15% flow reduction is due to pumping, a finding supported by the cited empirical water balances. It is critical that the WMD estimate a statistically-based confidence interval around the 1% NDM estimate and exercise an abundance of caution before allowing any additional groundwater extractions in the Rainbow Springshed.

In summary, the Florida Springs Institute provides the following recommendations to the WMD:

- Re-evaluate the effects of existing groundwater pumping in light of the statistical uncertainty applicable to the NDM, combined with the conflicting results from the empirical water balance estimates presented to the peer reviewers;

- Pick the most limiting metric derived during the assessment of significant harm to the protected Rainbow River System water resource and human use analysis, namely floodplain protection, and adopt a minimum flow of no more than an average 5% reduction compared to the pre-1950s baseline flows;
- Contract with the U.S. Geological Survey to estimate a pre-development water balance for the entire WMD and establish a safe groundwater yield that sets a cap on total groundwater pumping in the Southwest Florida WMD to limit all spring flow reductions to no more than 5% of pre-development flows; and
- Fully fund and implement the updated Rainbow River SWIM plan and work with the Florida Department of Environmental Protection and local stakeholders to revise the existing Rainbow Springs Basin Management Action Plan to achieve full compliance with the nitrate Total Maximum Daily Load (89% reduction in nitrogen loading in the Rainbow Springshed).

The Florida Springs Institute previously met with you and other WMD staff on October 11, 2016, to describe and discuss the technical basis of the draft minimum flows and the recommendations provided above. All of the available technical evidence supports the findings that the Rainbow Springs System is:

1. A truly outstanding natural water body with regional and national natural and economic value to human society;
2. Impaired by reduced flows, elevated nitrate concentrations, and excessive recreational pressures; and
3. Will not recover to an acceptably high level of environmental health without a significant reduction in regional groundwater pumping and nitrogen loading and enhanced management of recreational impacts.

Please deliver the message to your Executive Director and Governing Board that we respectfully request that they establish minimum flow limits or a water reservation for the Rainbow River System that ensure and sustain full recovery of healthy environmental conditions.

If you have any questions concerning this information, please call to discuss.

Sincerely,

Robert L. Knight, Ph.D., Director
Howard T. Odum Florida Springs Institute
(352) 538-6620
bknight@floridaspringsinstitute.org

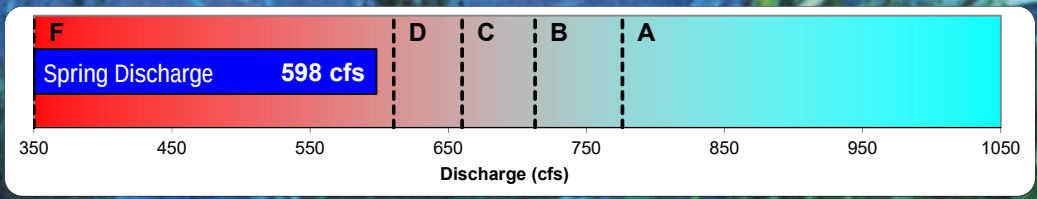
Enclosures

CC: Burt Eno, President Rainbow River Conservation
Dan Hilliard, Chairman, Florida Springs Council

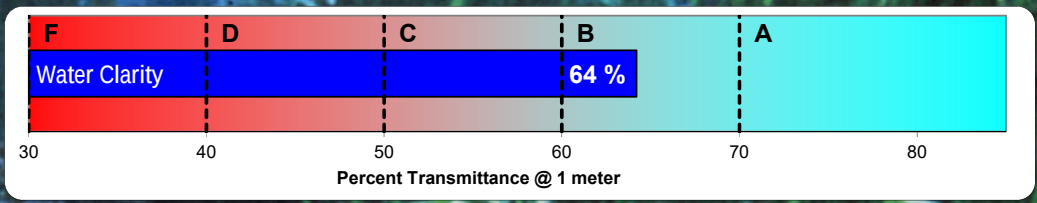
Drew Bartlett, Florida Department of Environmental Protection
Heather Obara, Associate Director, Florida Springs Institute

RAINBOW SPRINGS AND RIVER
ENVIRONMENTAL HEALTH - 2016 REPORT CARD

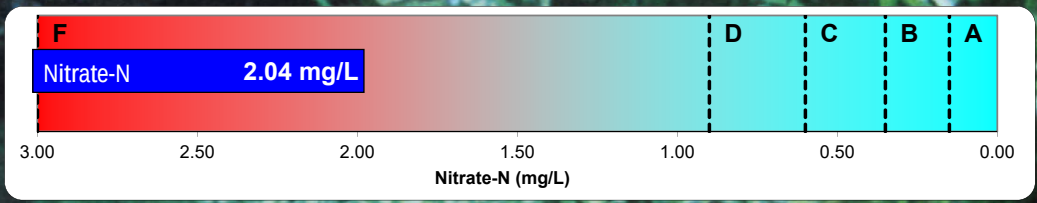
2016 GRADE C-



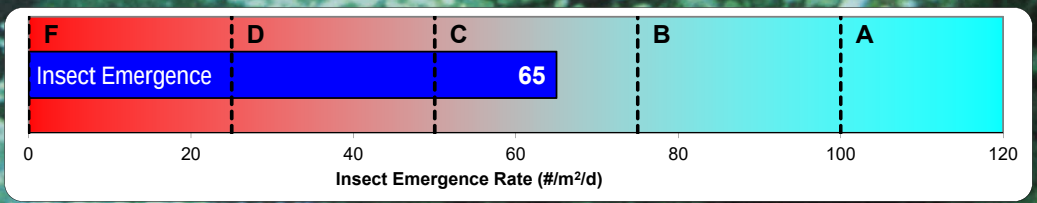
F



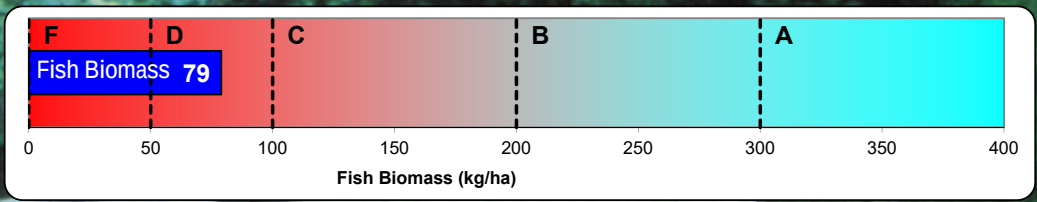
B



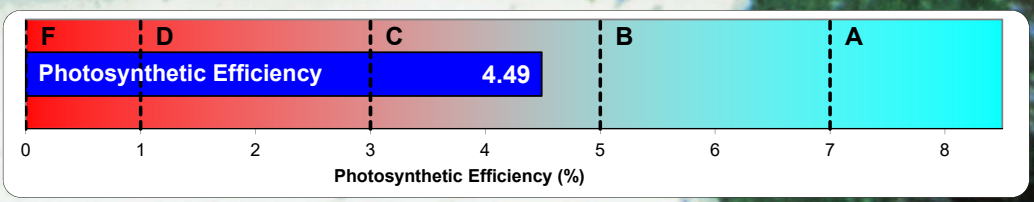
F



C



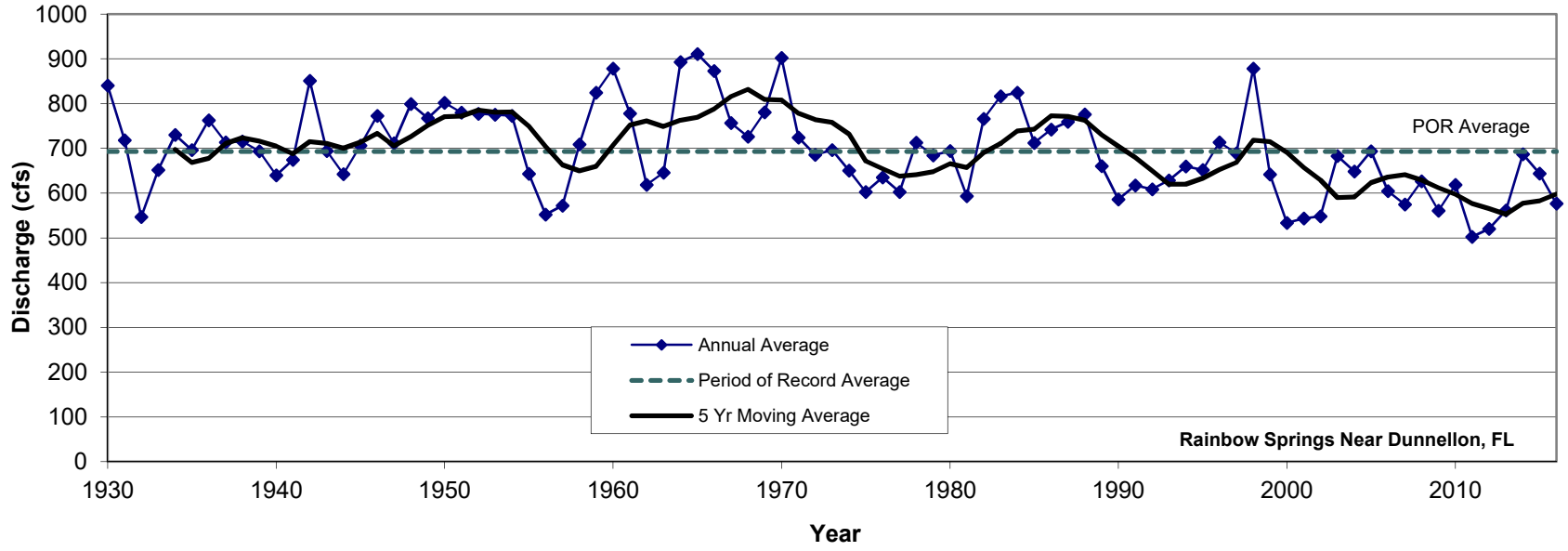
D



C+

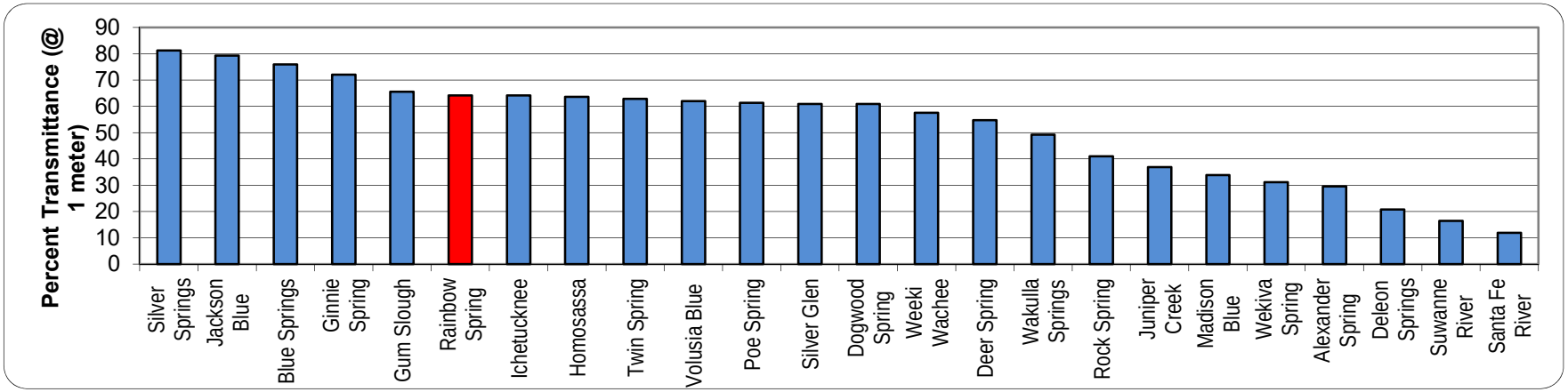
FLORIDA SPRINGS INSTITUTE

RAINBOW SPRINGS AND RIVER



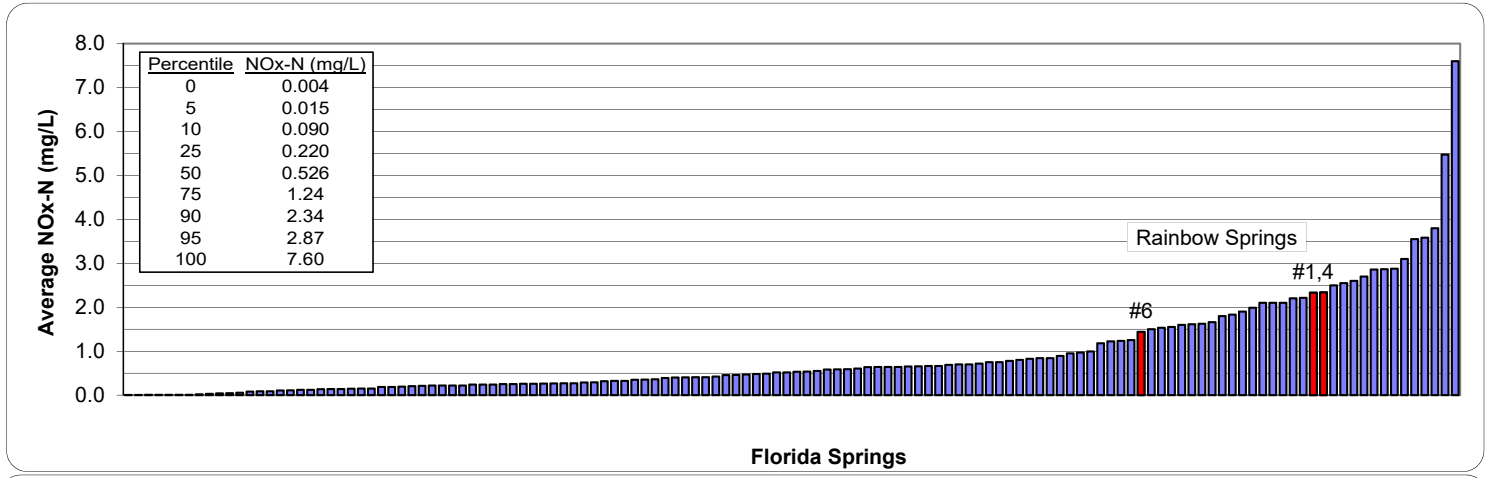
Spring Discharge @ US 484	Grade	Average (2012-2016)	A: > 776 cfs B: 713 - 775 cfs C: 660 - 712 cfs D: 610 - 659 cfs F: < 609 cfs
	F	598 cfs	

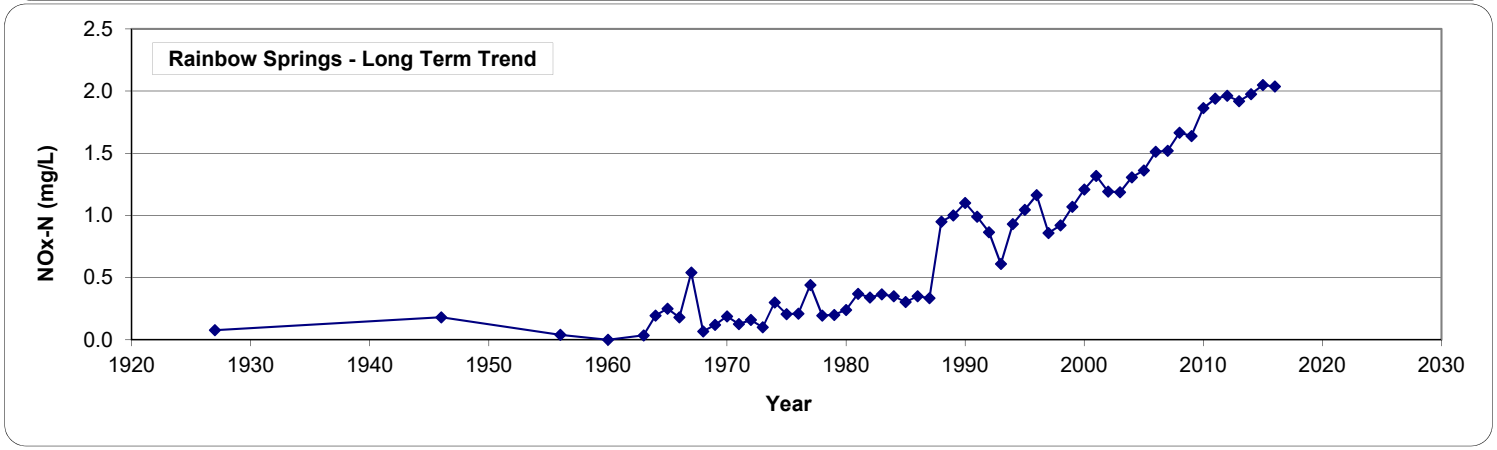
RAINBOW SPRINGS AND RIVER



Water Clarity @ Spring Run	Grade	Average (2015-2016)	A: > 70 % B: 60 - 69 % C: 50 - 59 % D: 40 - 49 % F: < 40 %
	B	**64%** Light Transmittance @ 1 meter	

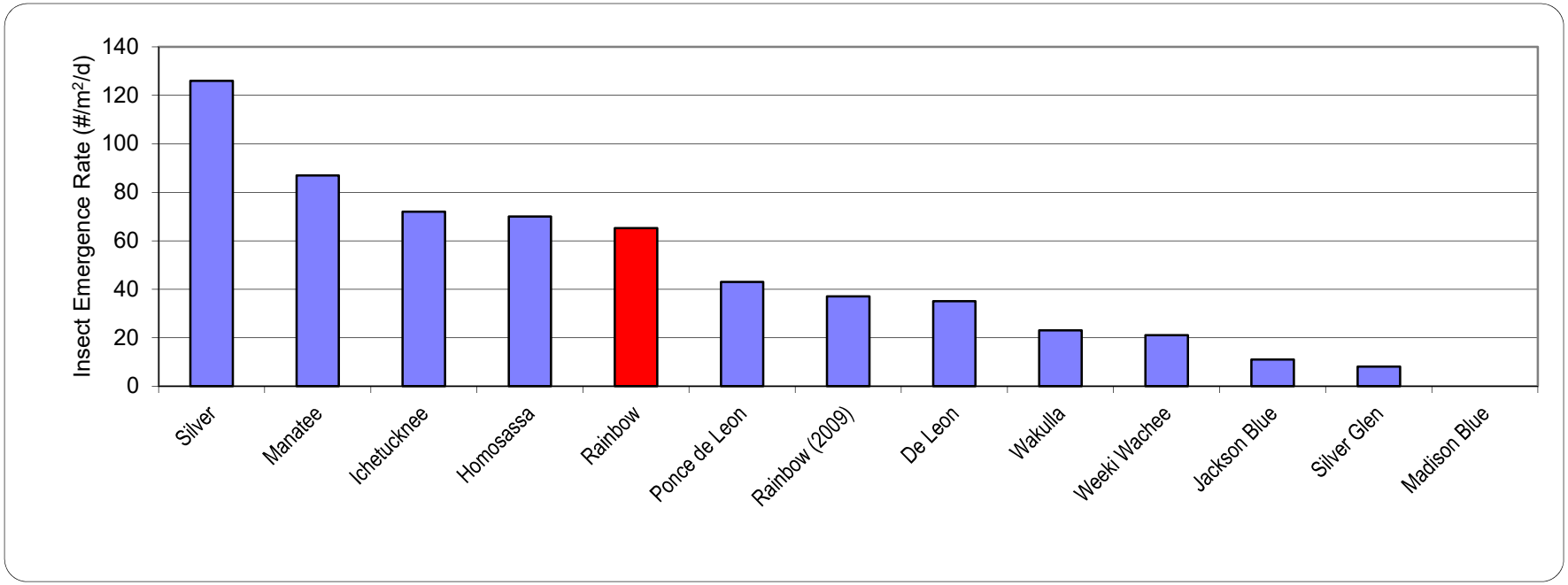
RAINBOW SPRINGS AND RIVER





Nitrate Concentration @ Spring Boil	Grade	Average (2016)	A: < 0.15 mg/L B: 0.15 - 0.35 mg/L C: 0.36 - 0.60 mg/L D: 0.61 - 0.90 mg/L F: > 0.90 mg/L
	F	2.04 mg/L	

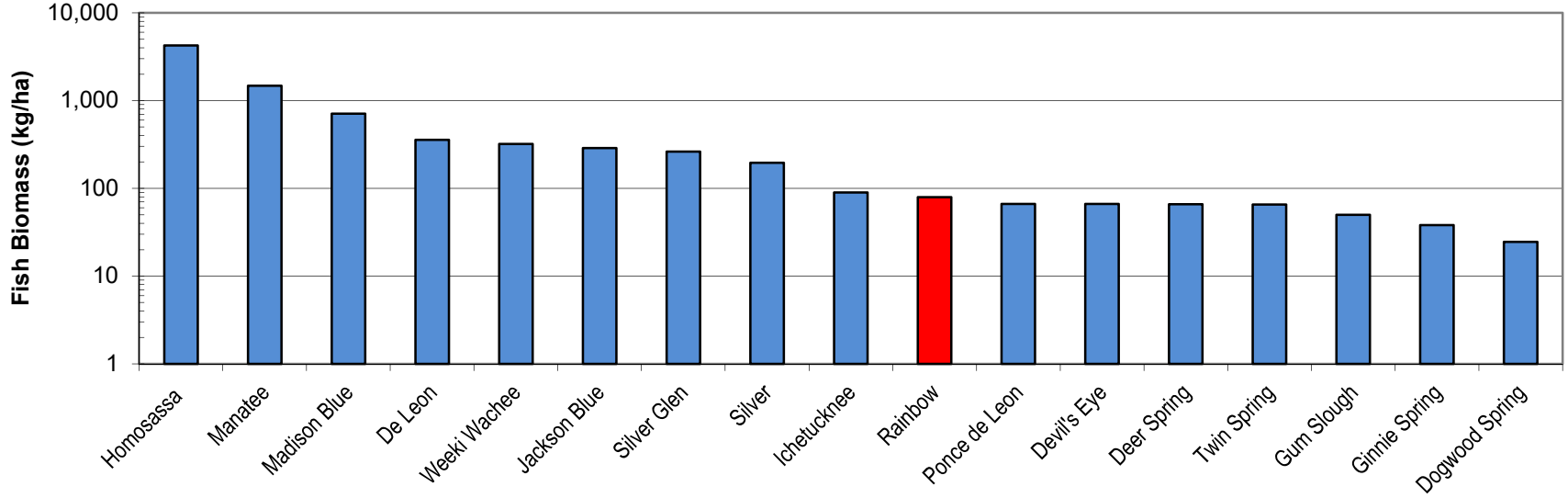
RAINBOW SPRINGS AND RIVER



Adult Aquatic Emergence @ Spring Run	Grade	Average (2015-2016)	A: > 100 B: 75 - 99 C: 50 - 74 D: 25 - 49 F: < 24
	C	**65** insects/m²/day	

Howard T. Odum FLORIDA SPRINGS INSTITUTE

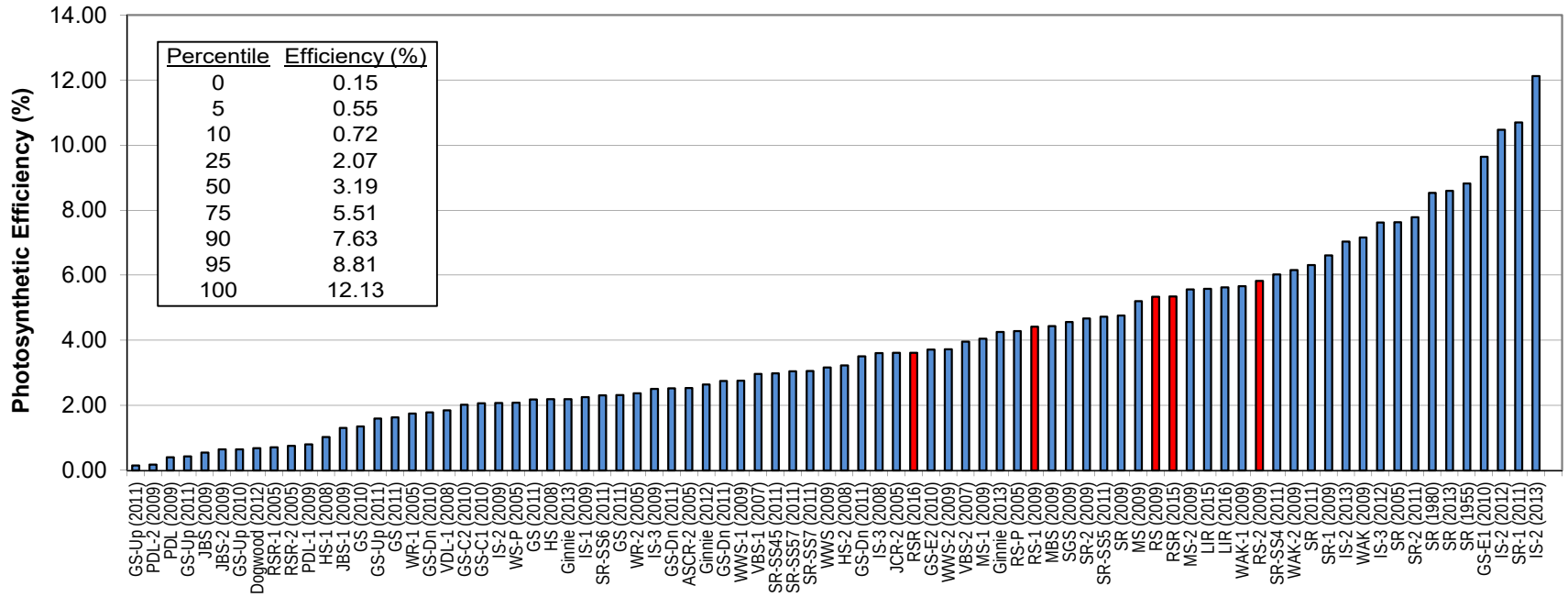
RAINBOW SPRINGS AND RIVER



Fish Biomass	Grade	Average (2016)	A: > 300 B: 200 - 299 C: 100 - 199 D: 50 - 99 F: < 50
	D	79 Biomass kg/ha	

Howard T. Odum FLORIDA SPRINGS INSTITUTE

RAINBOW SPRINGS AND RIVER



Photosynthetic Efficiency	Grade	Average (2015-2016)	A: > 7.0 B: 5.0 - 6.99 C: 3.0 - 4.99 D: 1.0 - 2.99 F: <1.0
	C+	4.49 %	

Howard T. Odum FLORIDA SPRINGS INSTITUTE