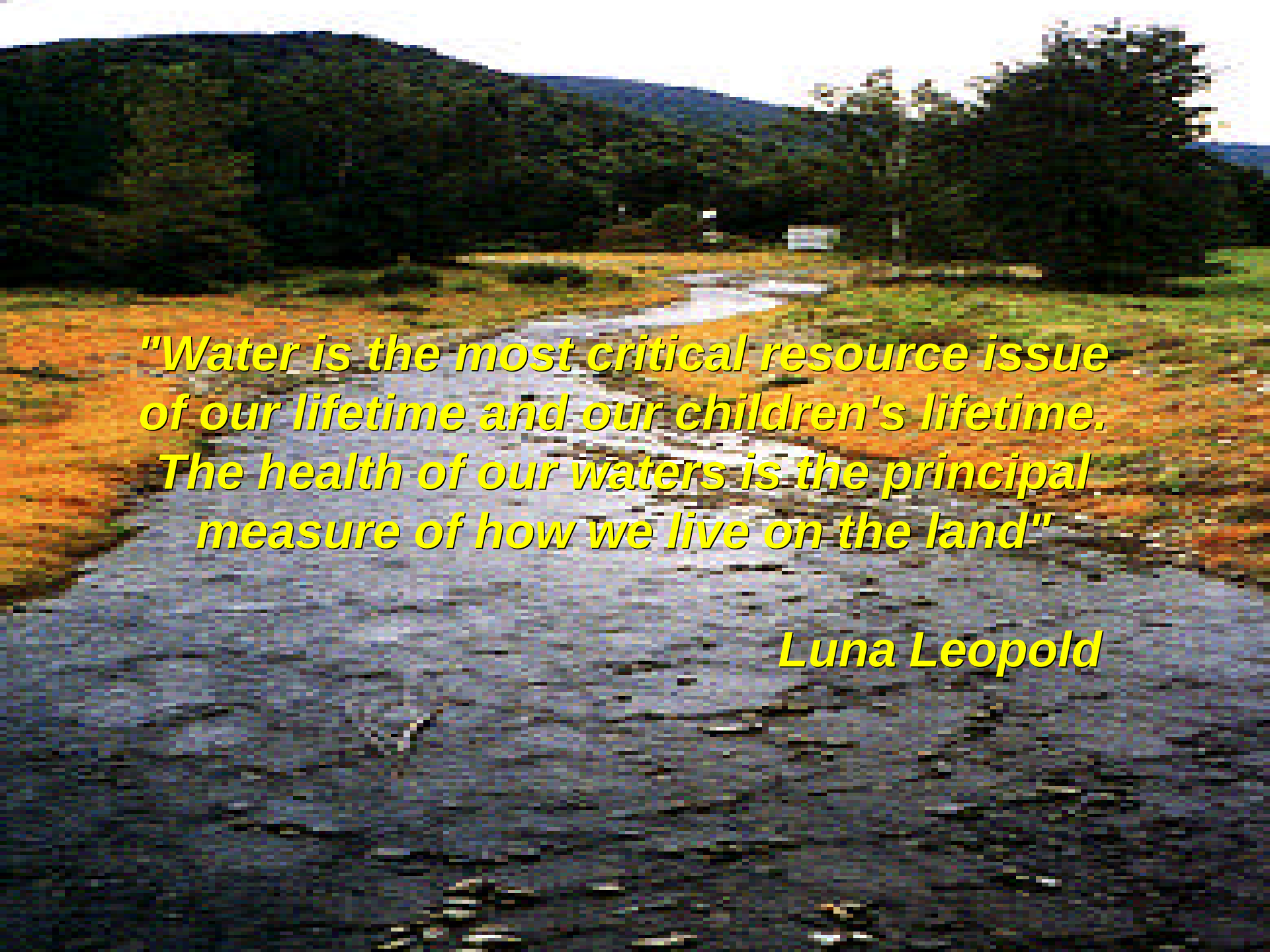
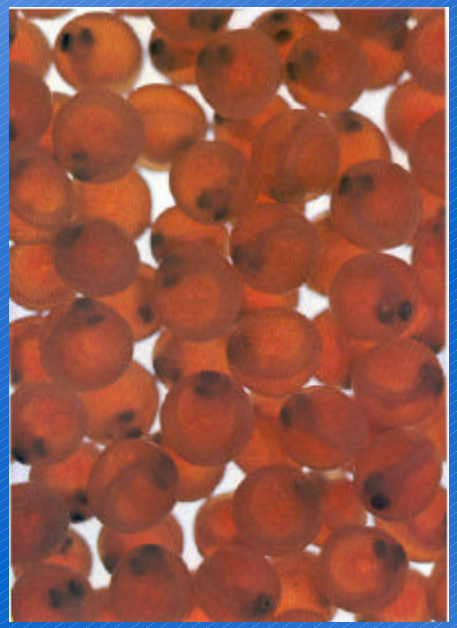

"Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land"
Luna Leopold

Temperature Influences on Fish

- Embryonic Development
- Growth
- Survival



eggs

larvae

fry

Temperature also has synergistic effects:

- **dissolved oxygen levels**
- **contaminant toxicity**
- **suspending or precipitation of solids**
- **rate at which chemical and biochemical reactions occur**

Temperature Conditions in the North Fork Shenandoah River

Preliminary Analysis of Summer 2001 Data in Relation to Fish Habitat

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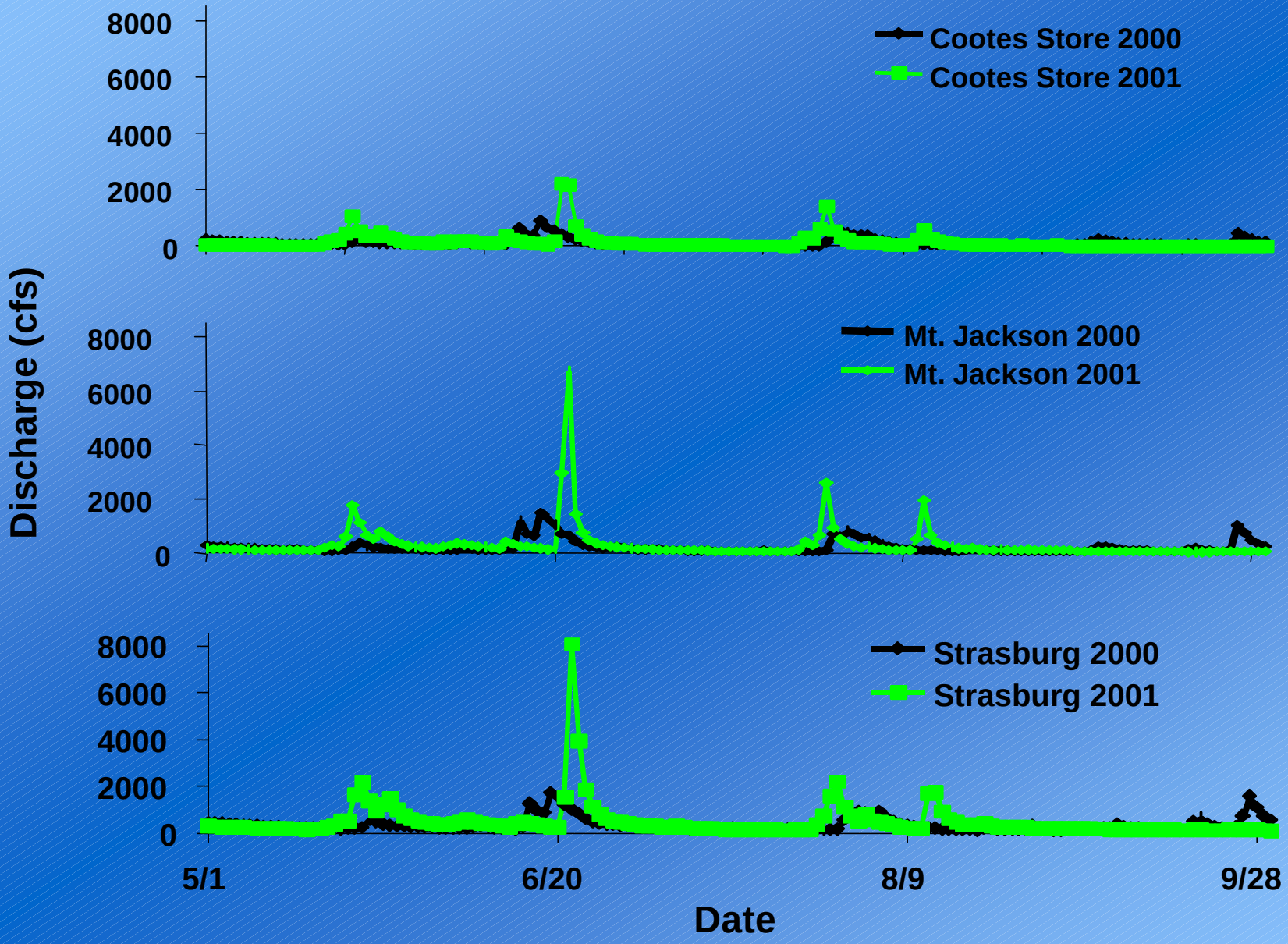
Virginia Polytechnic Institute and State University

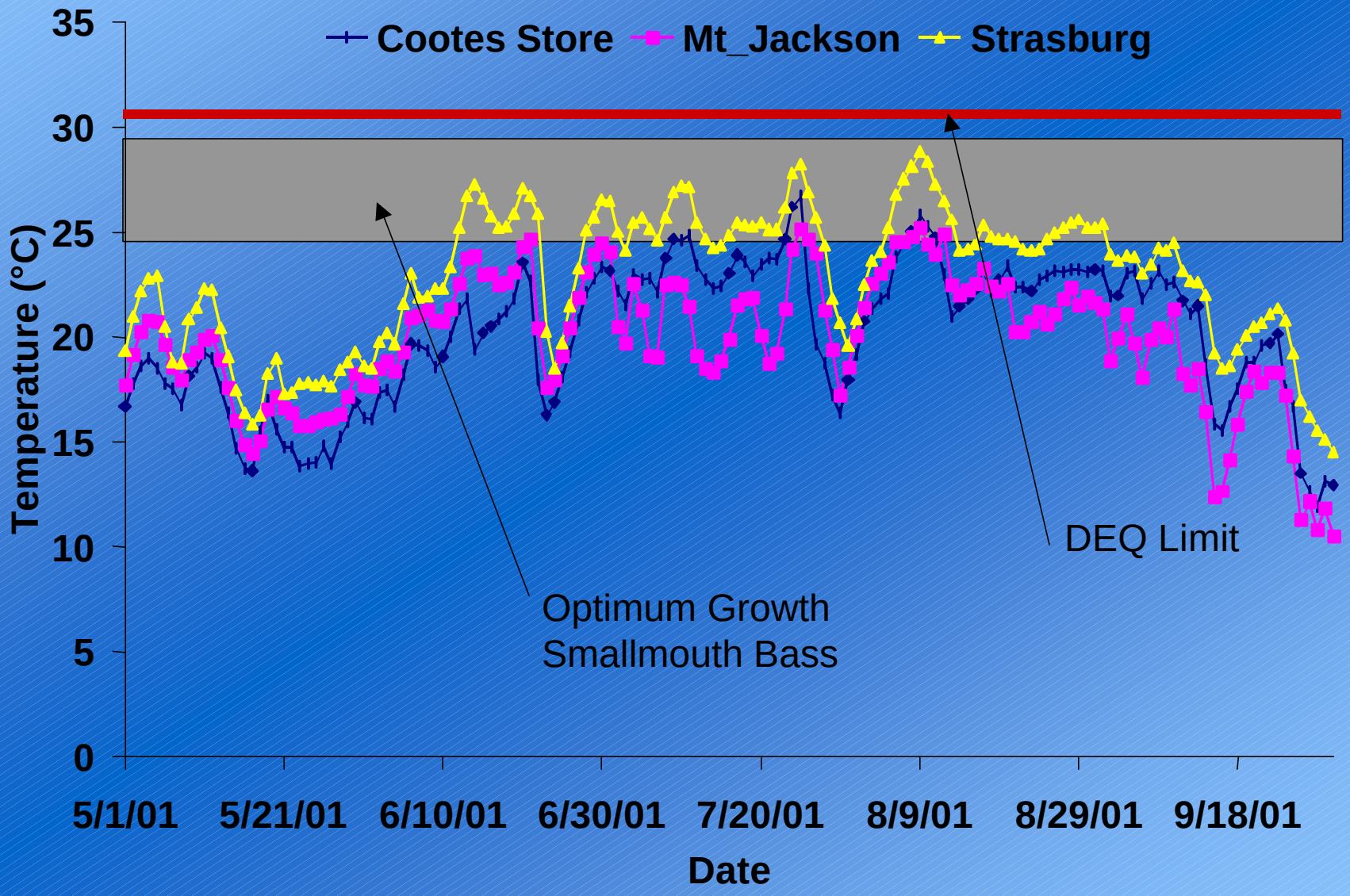
Temperature Monitoring in the North Fork Shenandoah River

- Initiated in September 2000
- Three locations: Cootes Store, Mt. Jackson, and Strasburg
- Continuously monitor temperature on an hourly basis
- Located several centimeters off from the bottom, in flowing water and out of direct sunlight

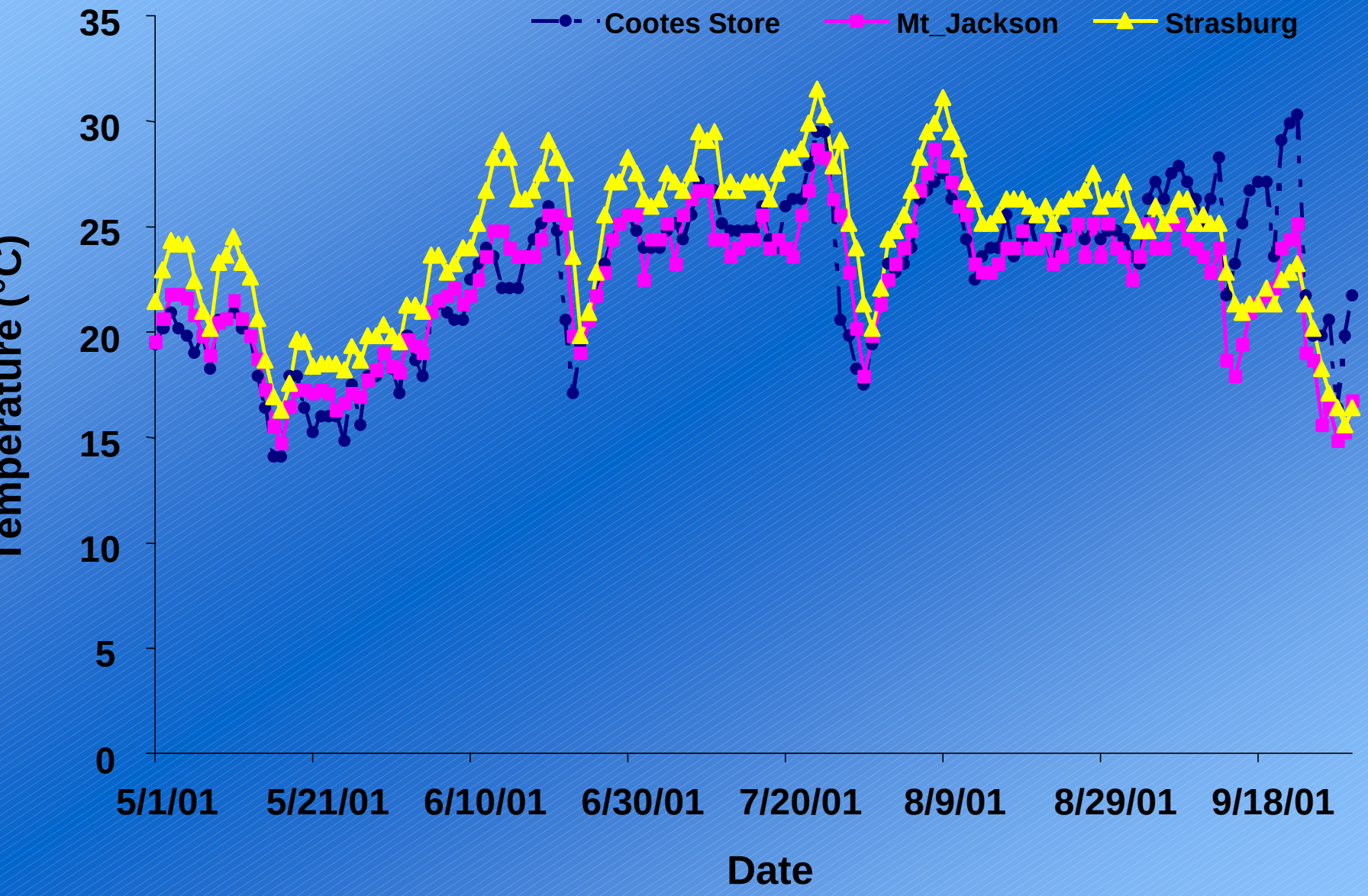
Discharge Between Years 2000 and 2001



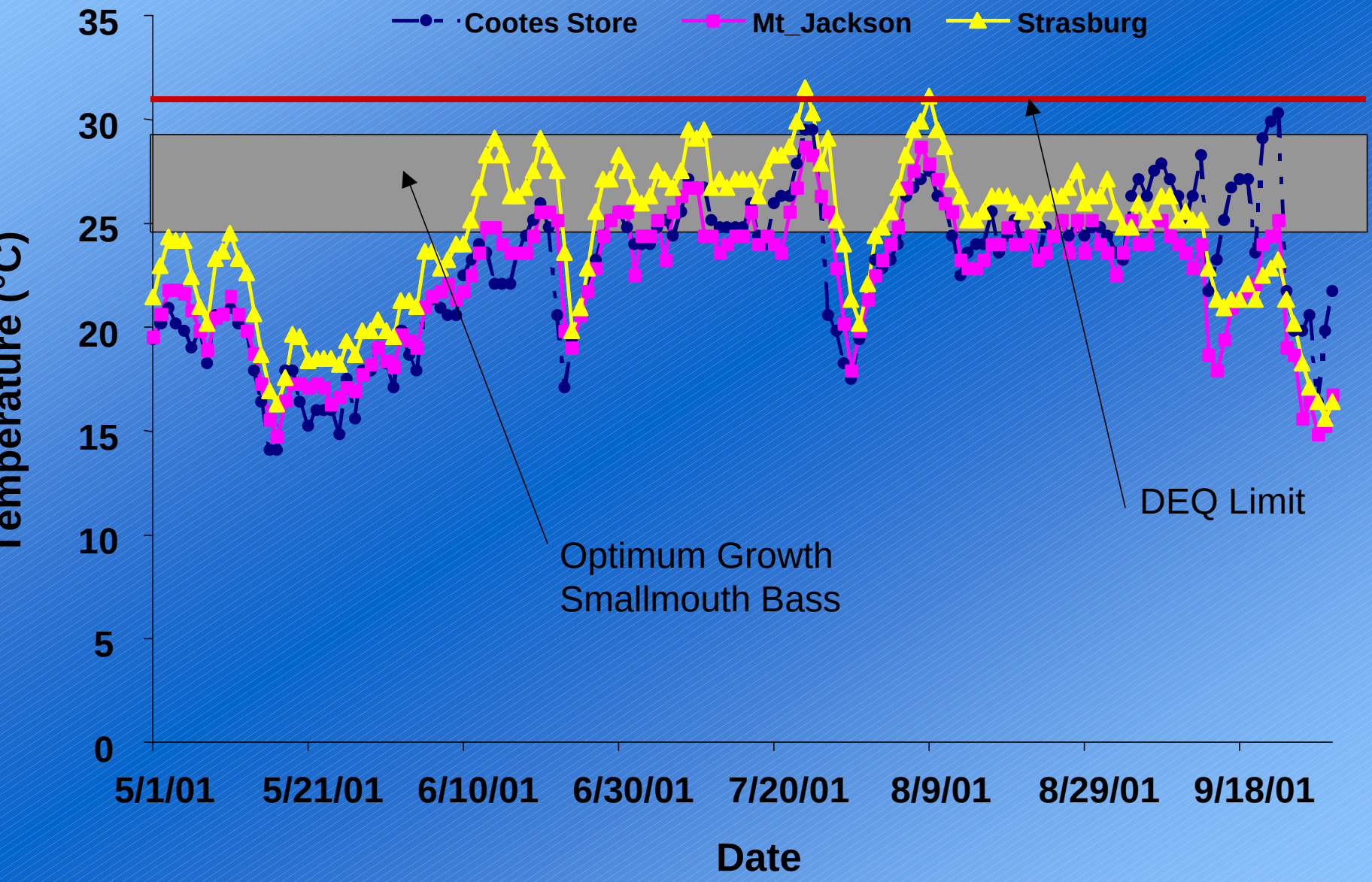
Mean Daily Temperature 2001



Maximum Summer Temperatures



Maximum Daily Summer Temperature



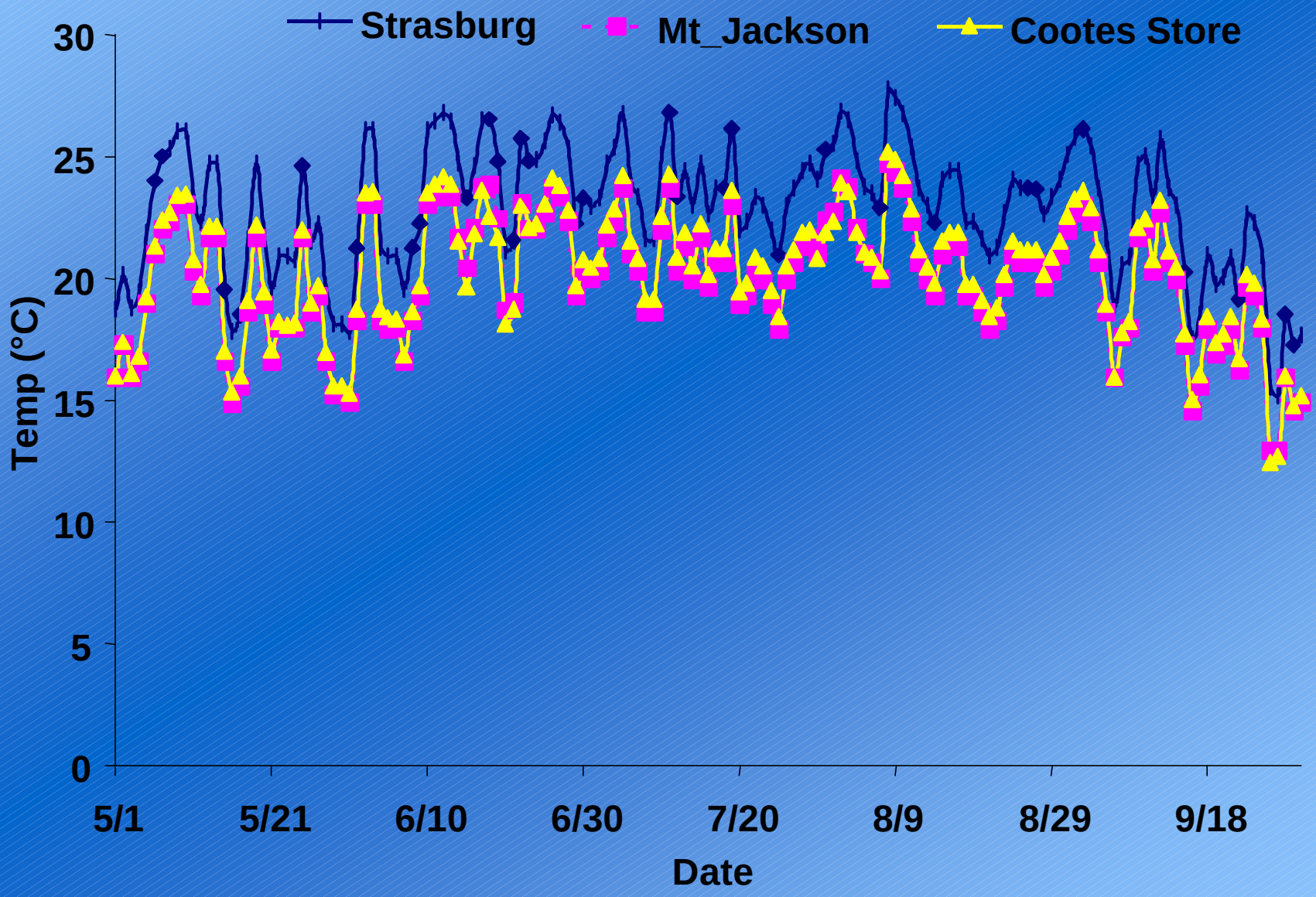
Temperature Prediction

- Summer 2000 water temperatures are unknown, but of interest
- Can predict water temperature by using statistical regression and properties that are known to influence water temperature
- Flow and Air temperature strong dictate stream temperatures

All models were statistically significant-

- Prediction model for Coots Store: $r^2 = 0.79$
- Prediction model for Mt. Jackson: $r^2 = 0.82$
- Prediction model for Strasburg: $r^2 = 0.80$

Predicted Mean Daily Summer Temperatures 2000



Summary on Preliminary Temperature Information

- Mean daily temperatures appear reasonable for smallmouth bass growth, even at low flow
- Maximum daily temperatures rarely approach the DEQ stated water quality “healthy” limit for non-trout streams in Virginia
- Still unknown what synergistic effects may be occurring between temperature and dissolved oxygen and other water quality parameters