

Trends in Biomass and Abundance of Brook and Brown Trout in an Appalachian Stream



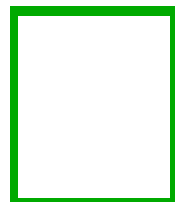
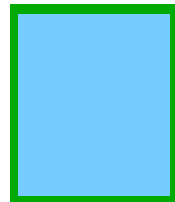

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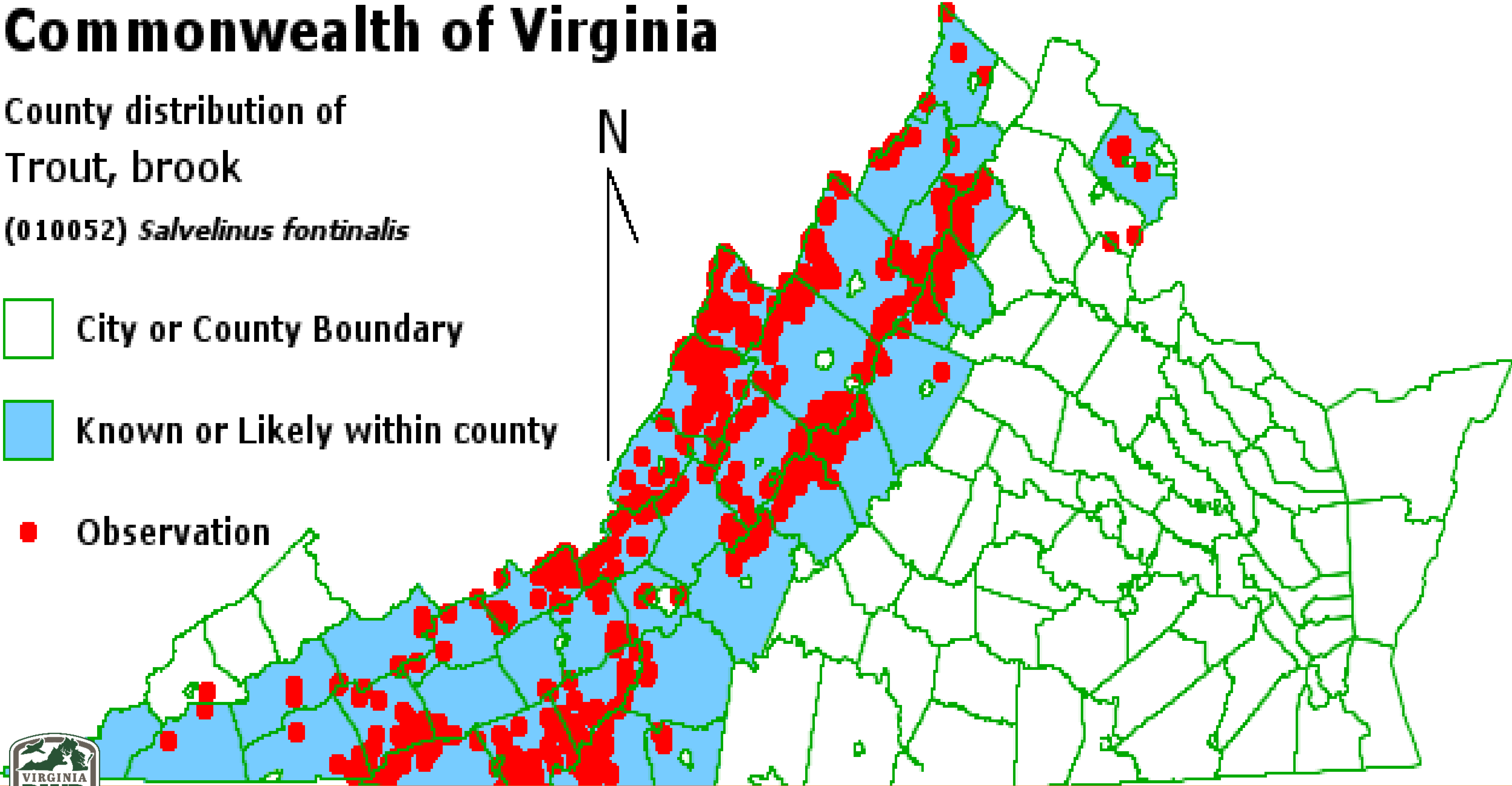


Commonwealth of Virginia

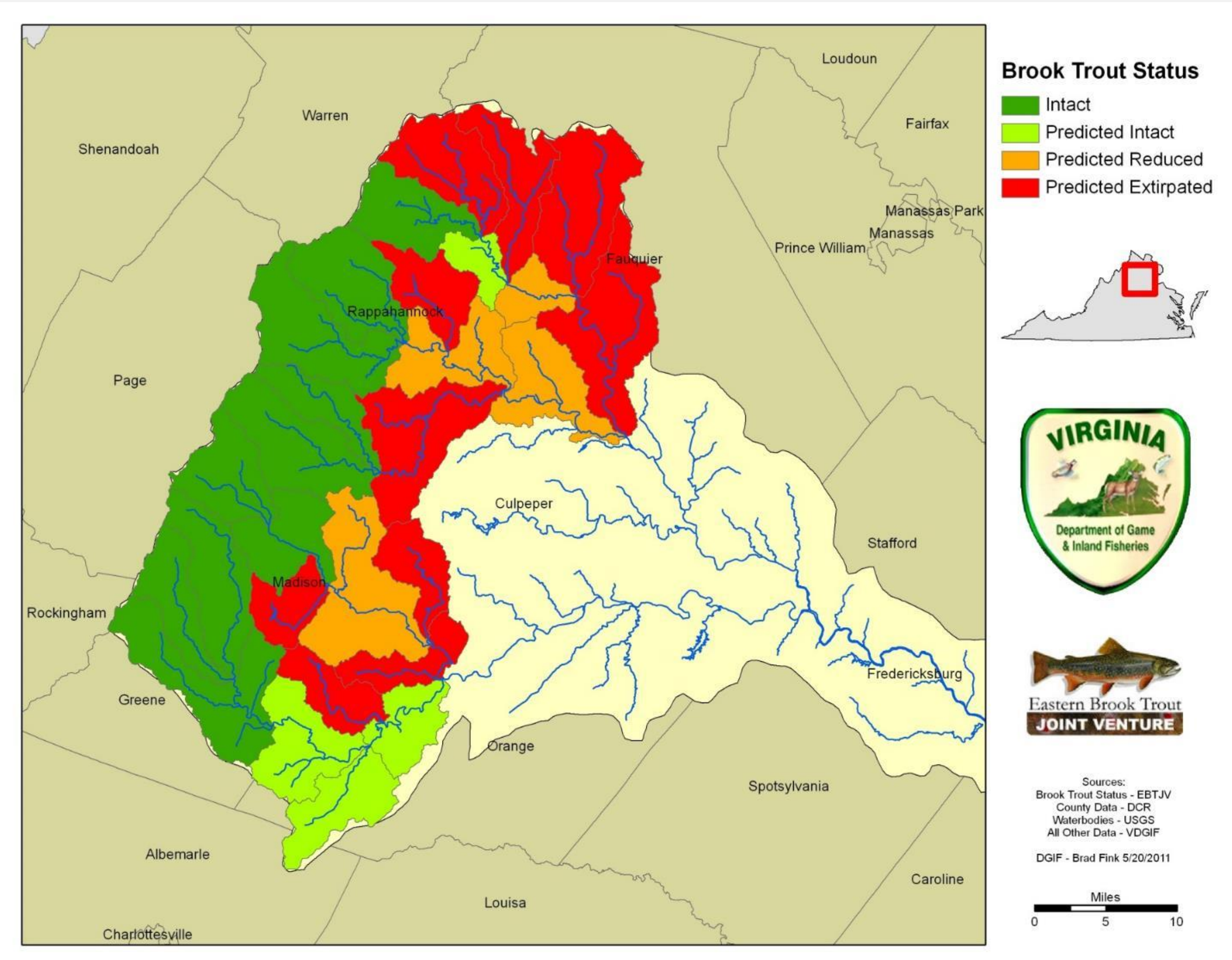
County distribution of
Trout, brook

(010052) *Salvelinus fontinalis*

-  City or County Boundary
-  Known or Likely within county
-  Observation



BKT Status in Rappahannock Watershed



Primary Threats to Brook Trout

Poor land management

High water temperature

Sedimentation

Non-native fish species

Urbanization

Riparian habitat

Brown Trout

Stream fragmentation

Dams

Forestry

Ranked in order by EBTJV 2006



Brown Trout Discovered in Conway River in 1987



Problem?

Most anglers very happy with multi species salmonid fishery.



Problem?

BUT... "Spawning interactions between BNT and BKT may contribute to species replacement", Grant et al. 2002 NAJFM (MN).

Multiple accounts of issues with reproduction of sympatric populations (MI & MN).

Habitat and feeding interactions between species in artificial stream (DeWald & Wilzbach, 1992 TAFS).



And...

Decline of BKT with BNT presence w/ changing environmental conditions and parasites in WI (Mitro 2016 TAFS).



Conway River Sampling

Annually beginning in 2011 thru 2019 except 2018 (n=8).

Sporadically from 1976 – 2008 (n=7).

Brown Trout found in 1987.



Rapidan River Sampling

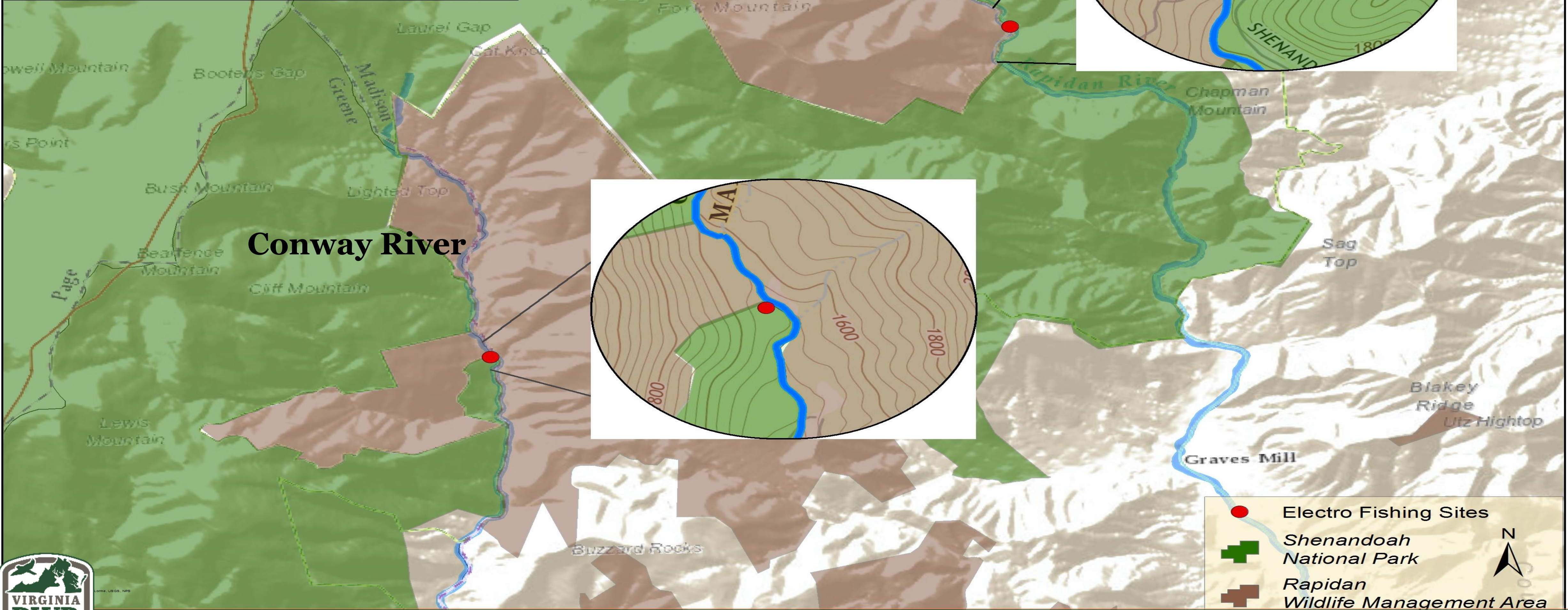
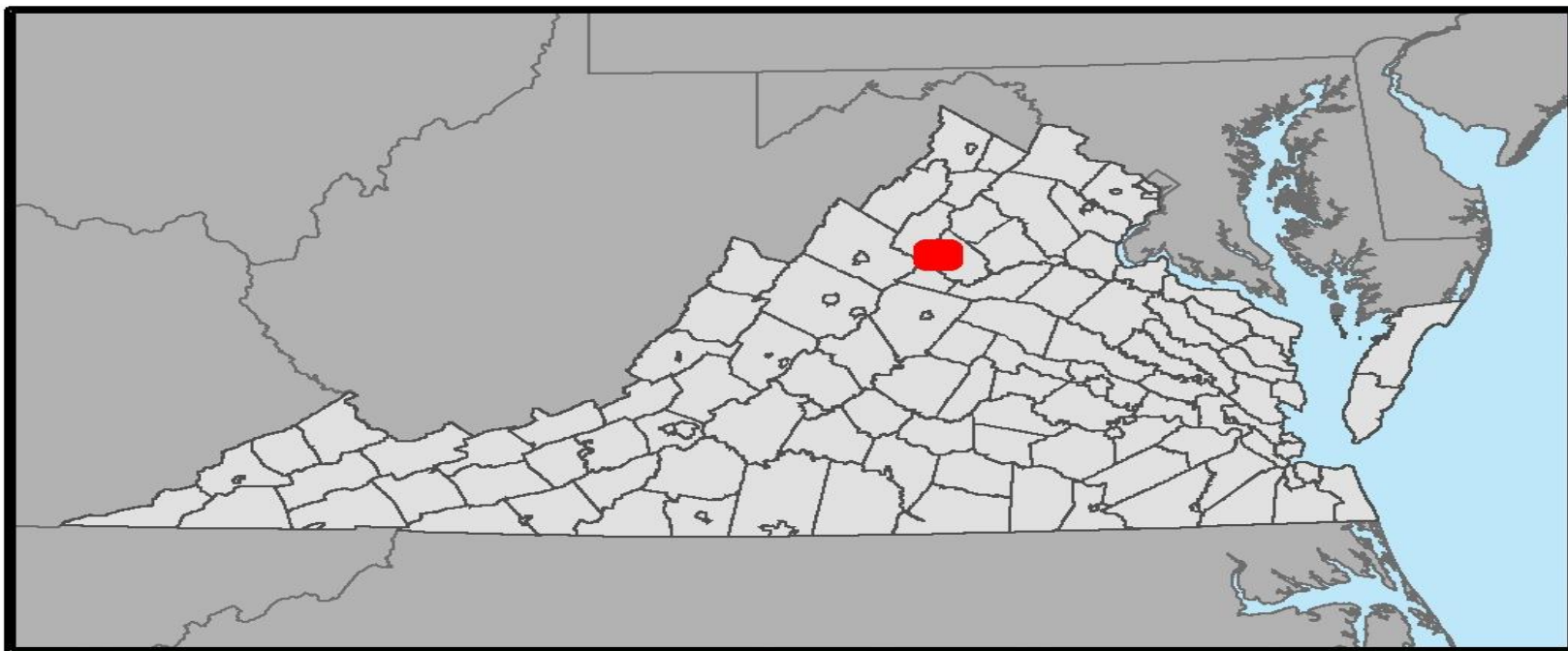
- Annually beginning in 2011 thru 2019, except 2018 (n=8).
 - Most alternate years since 1997 (n=8).
 - “Blue Ribbon” stream in adjacent watershed – no BNT.
- Used as reference stream to evaluate BKT trends.



Both Rivers

- 3-run depletion BP electrofishing with two units.
- Community sampling - fish held in pens after runs.
- TL/WT recorded for each trout.
- Nongame counted and bulk weighed.
- Microfish used for estimates of population and biomass.





Rapidan Watershed=4526 acres

Acres: 4525.67

Upper Rapidan
EF Site

Conway Watershed=3189 acres

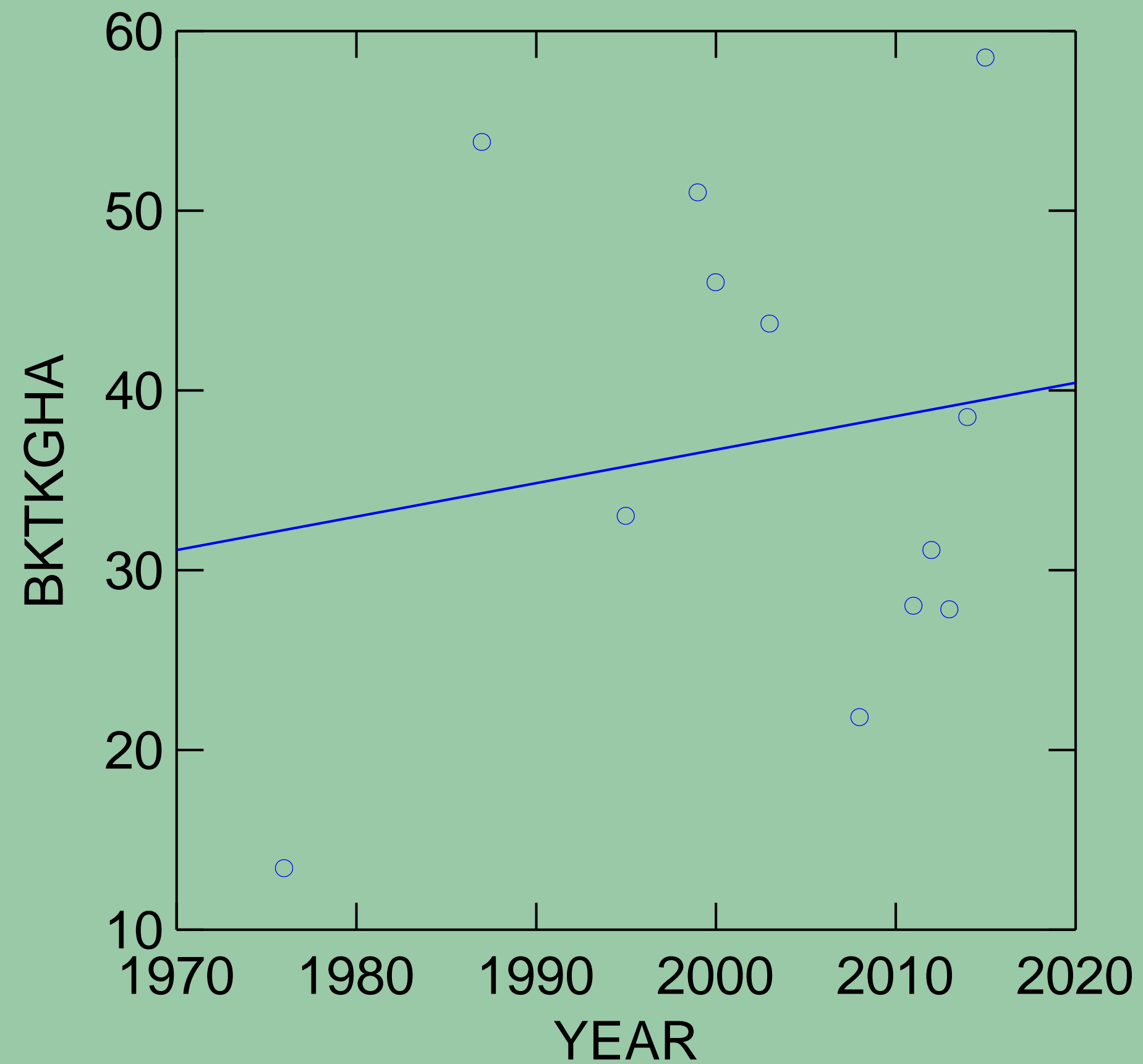
Acres: 3188.66

Upper Conway
EF Site

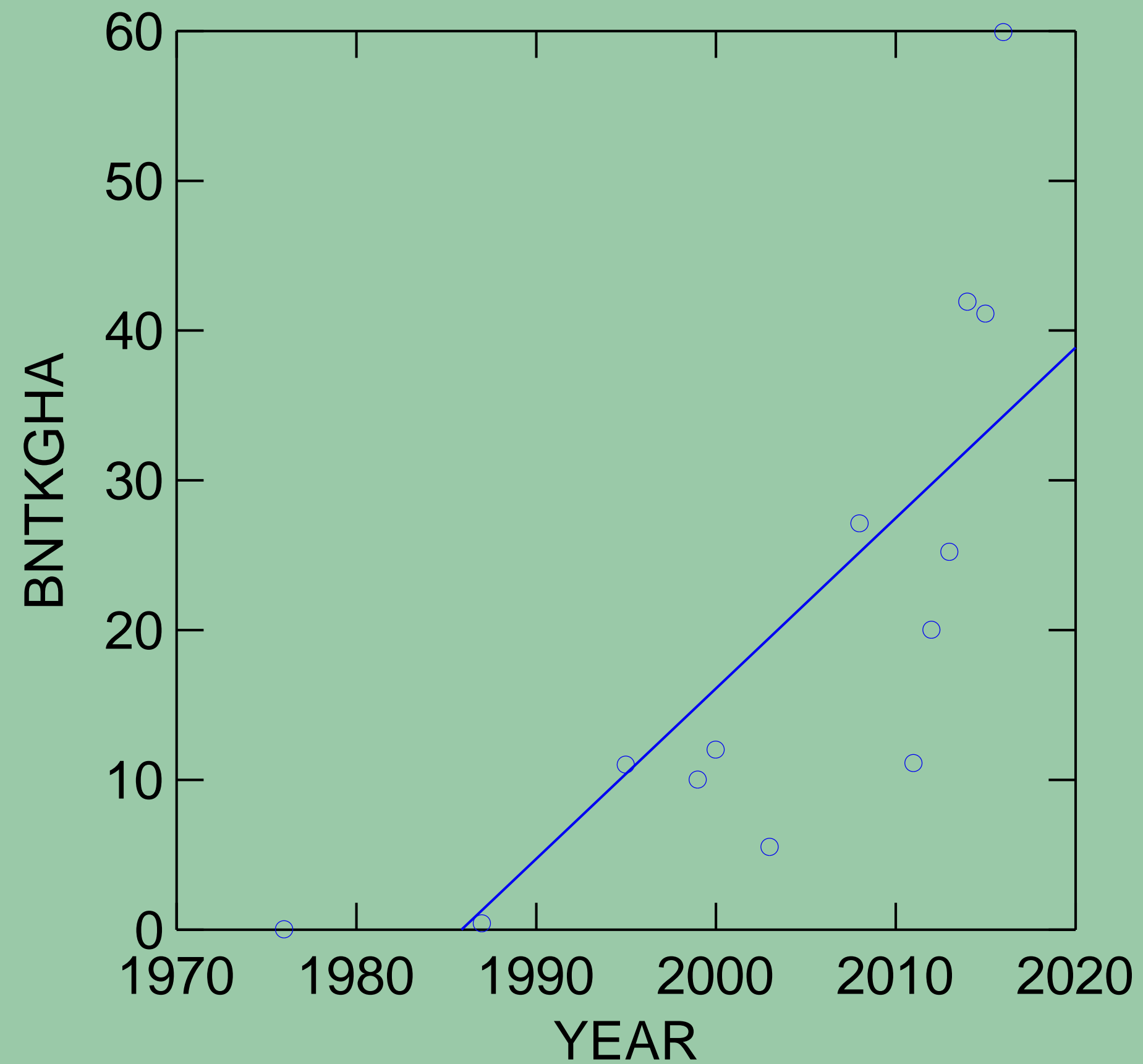




Conway River Brook Trout Biomass



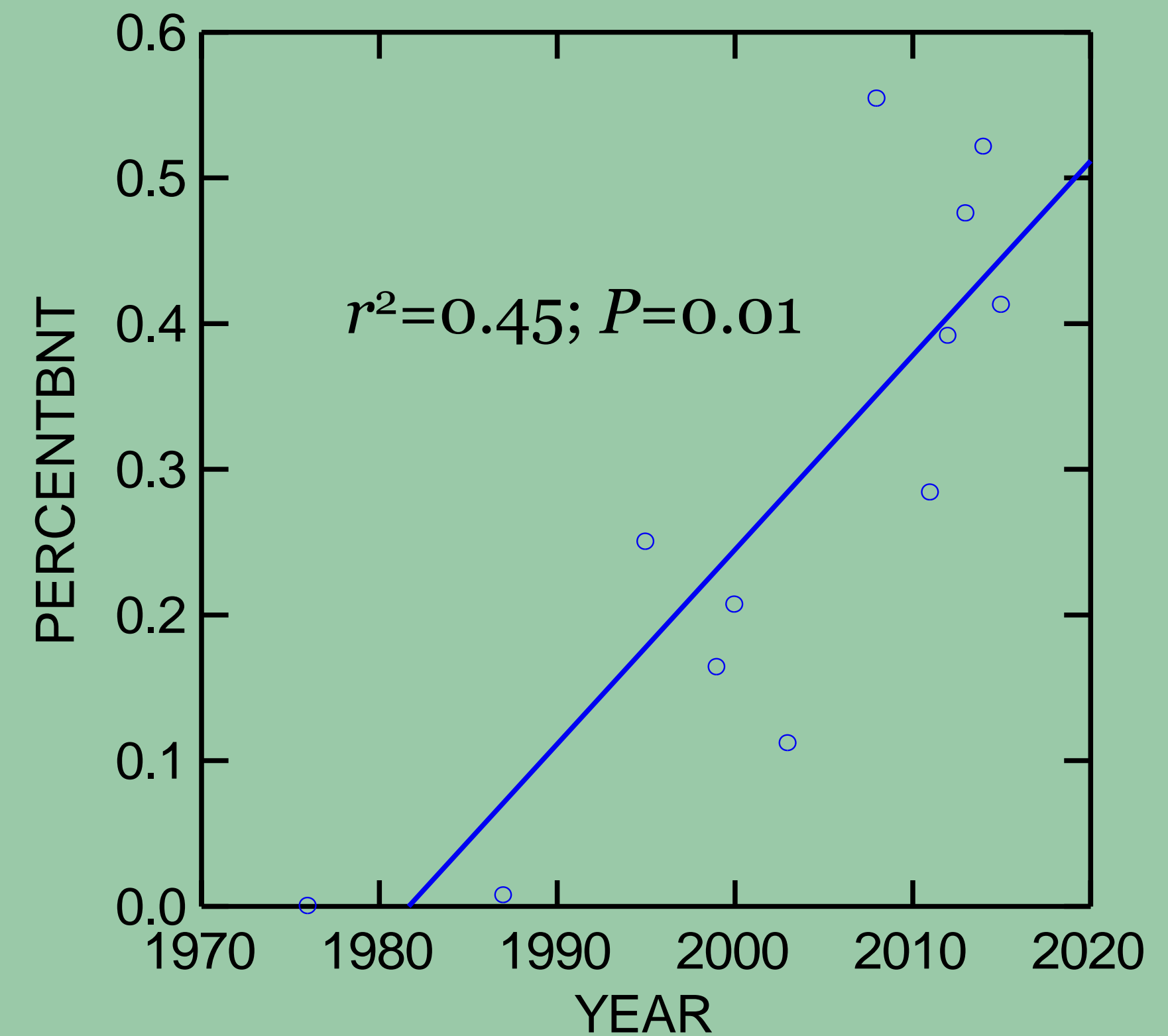
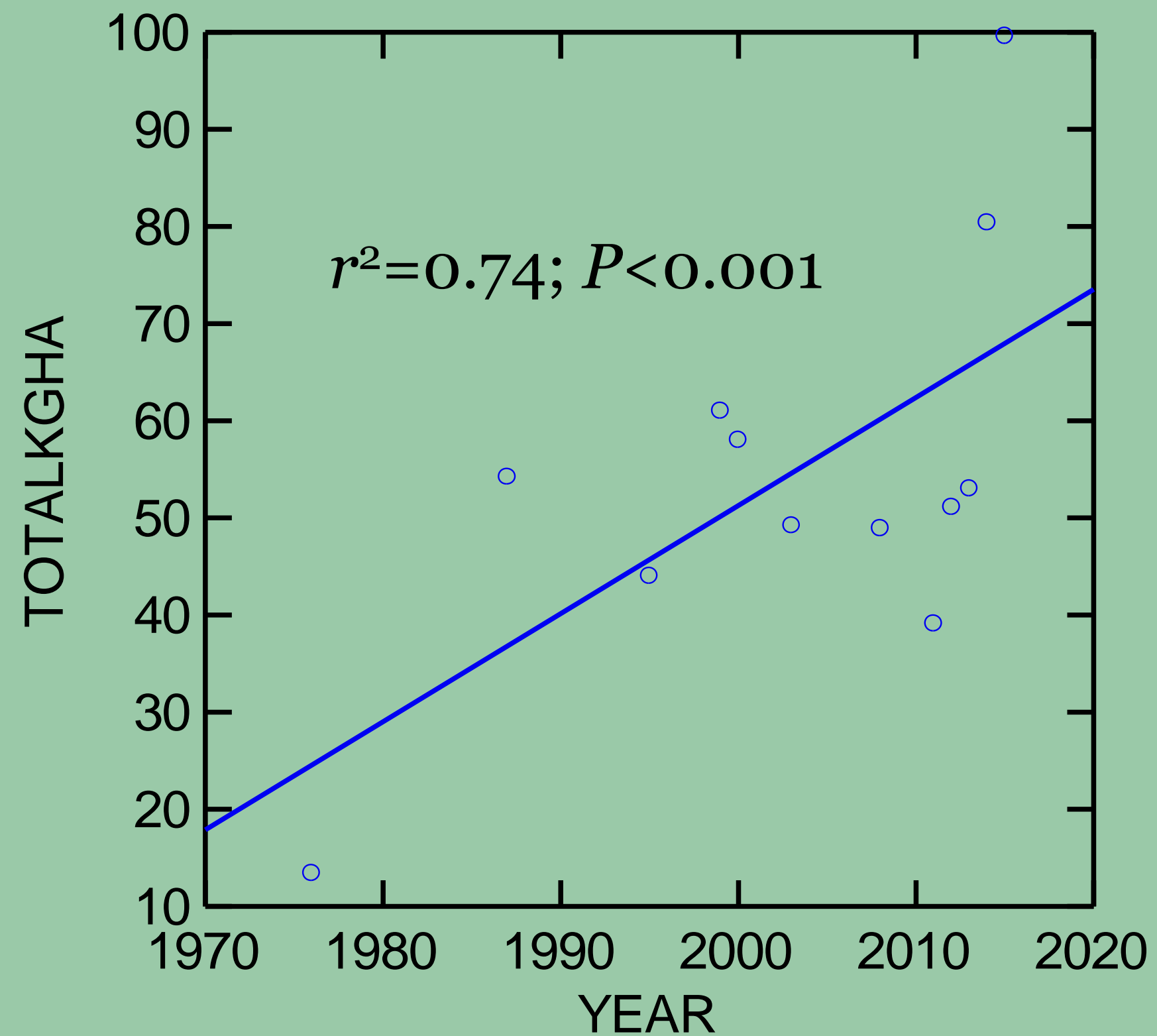
Conway River Brown Trout Biomass



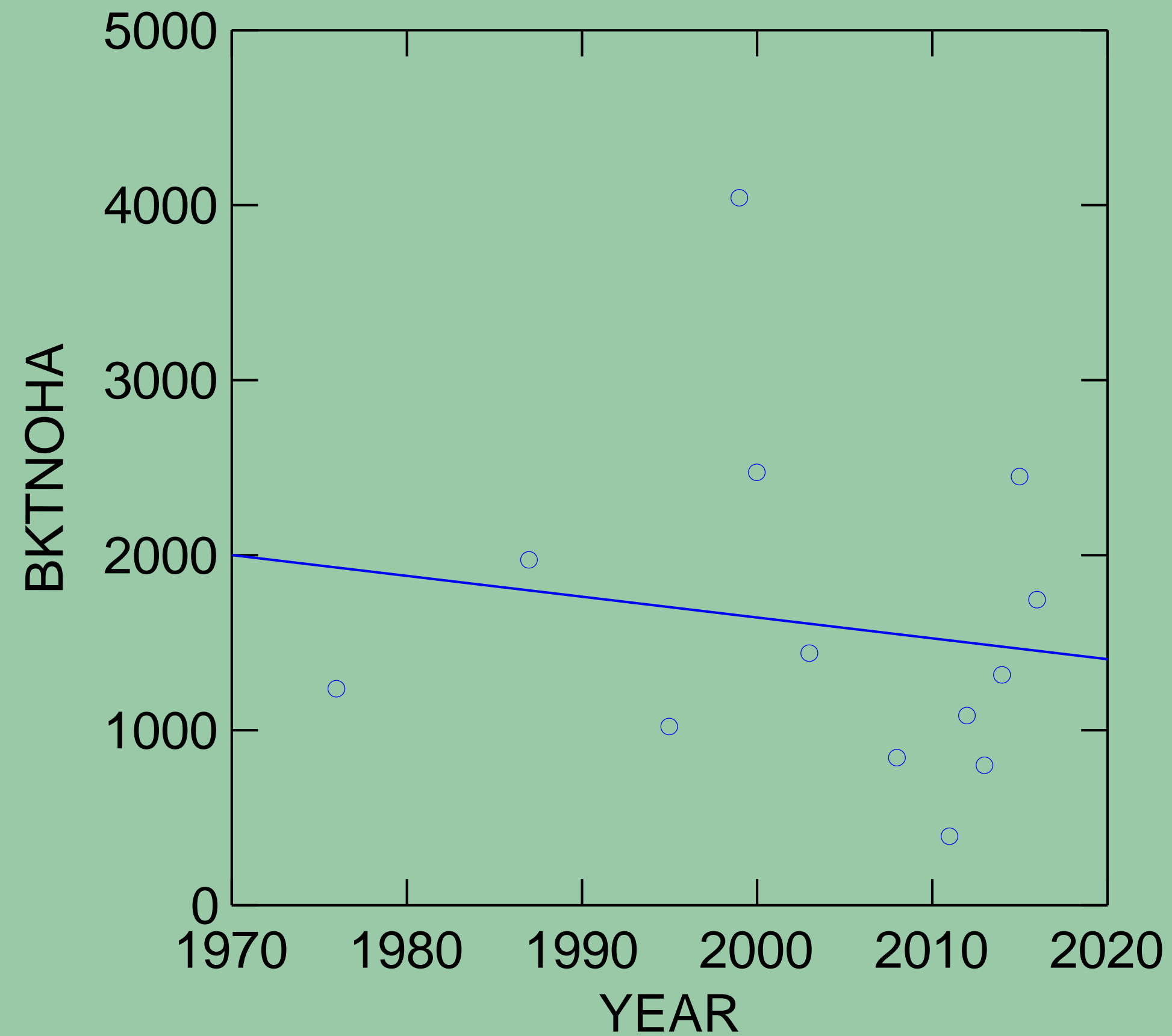
$r^2=0.59$
 $P=0.002$



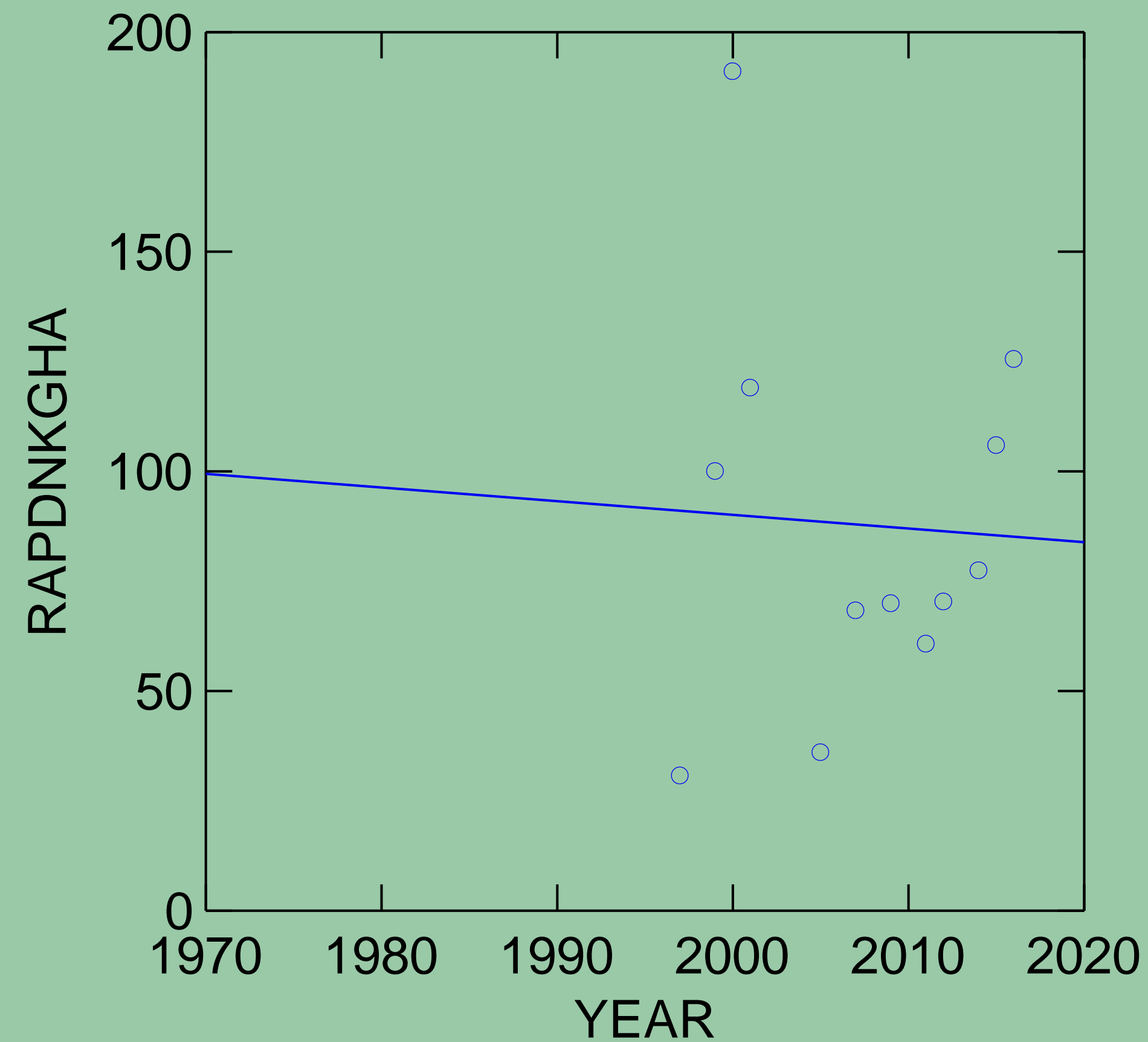
Conway River Total Biomass and % Brown Trout



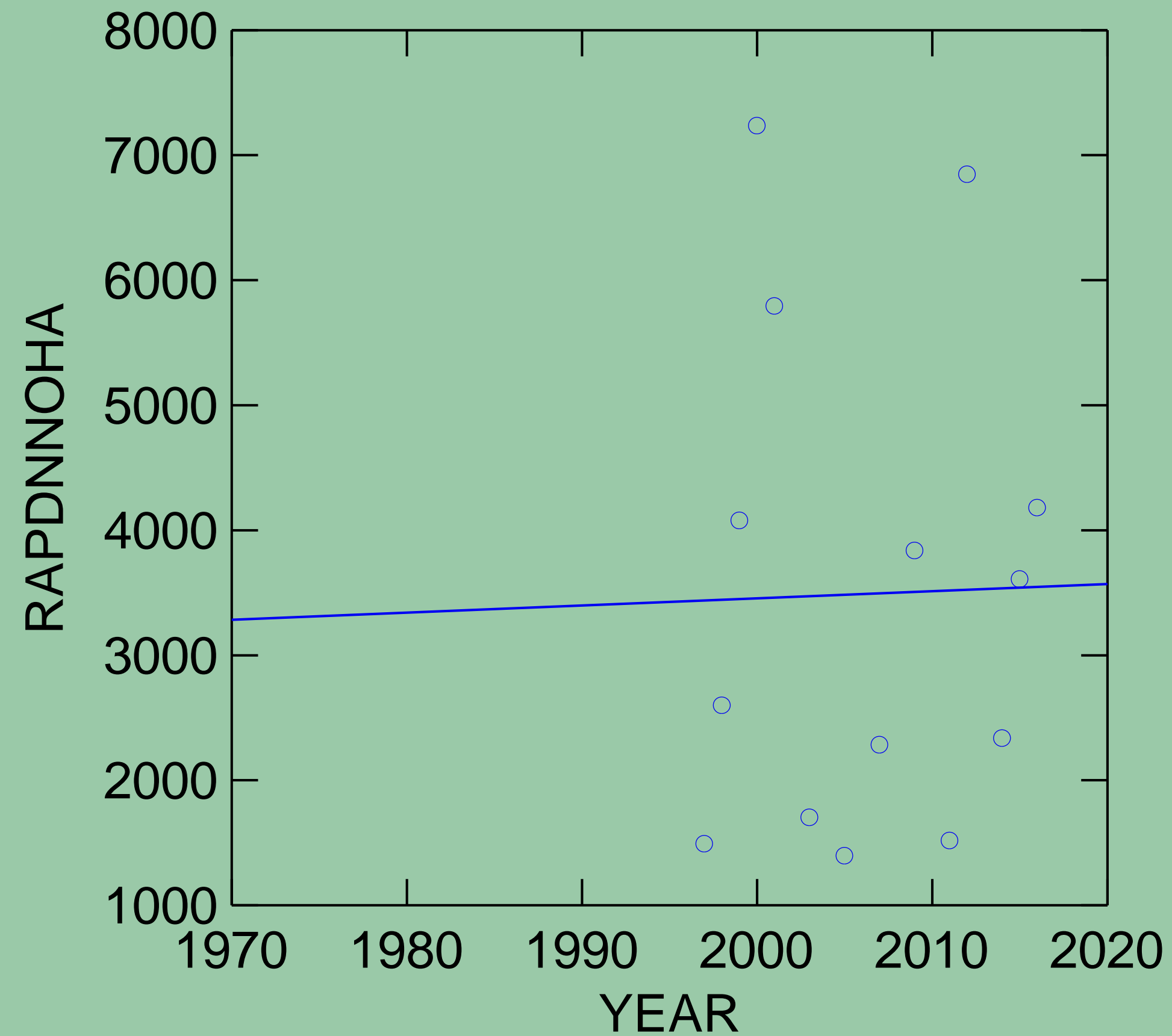
Conway River Brook Trout Abundance



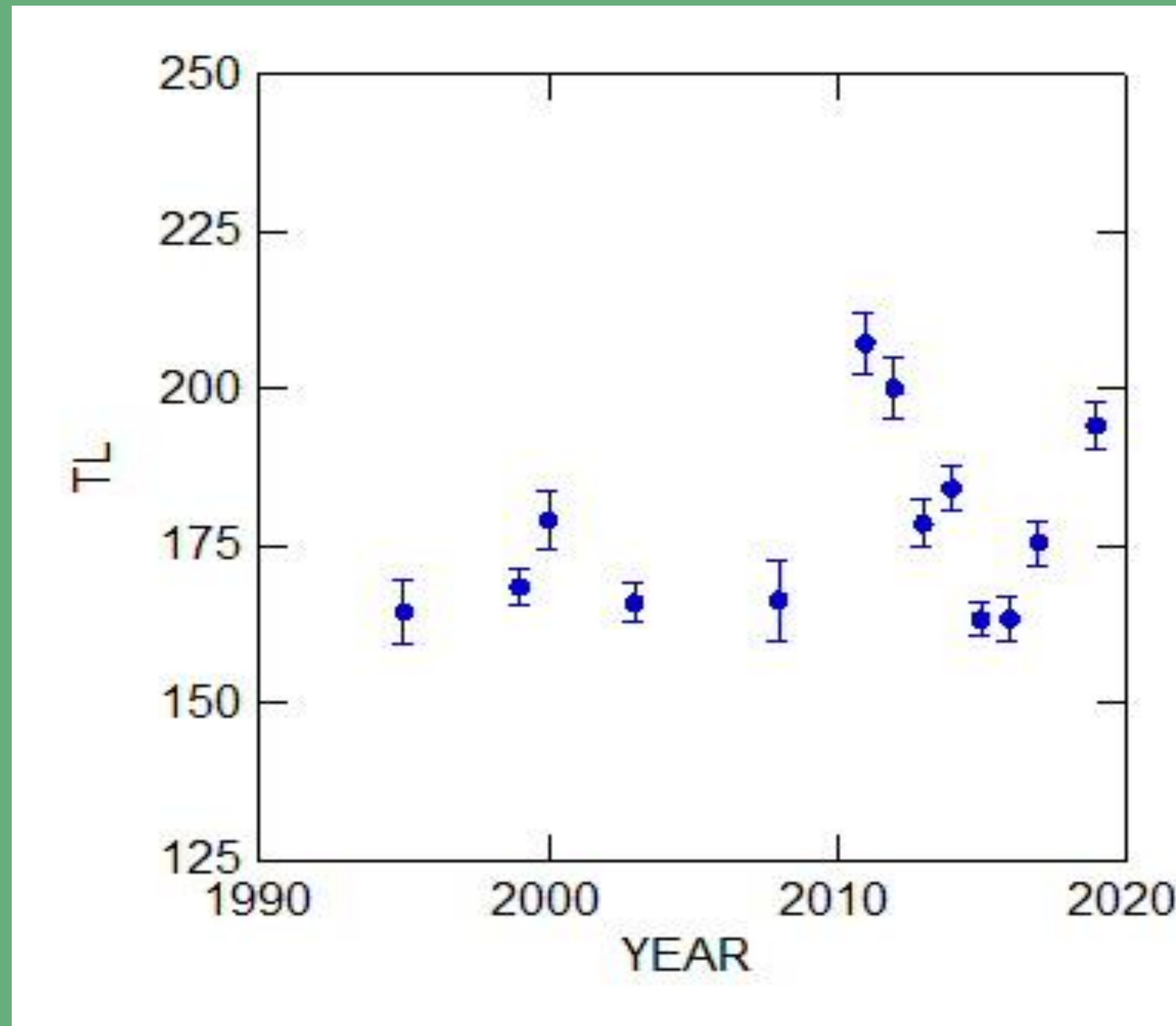
Rapidan River Brook Trout Biomass



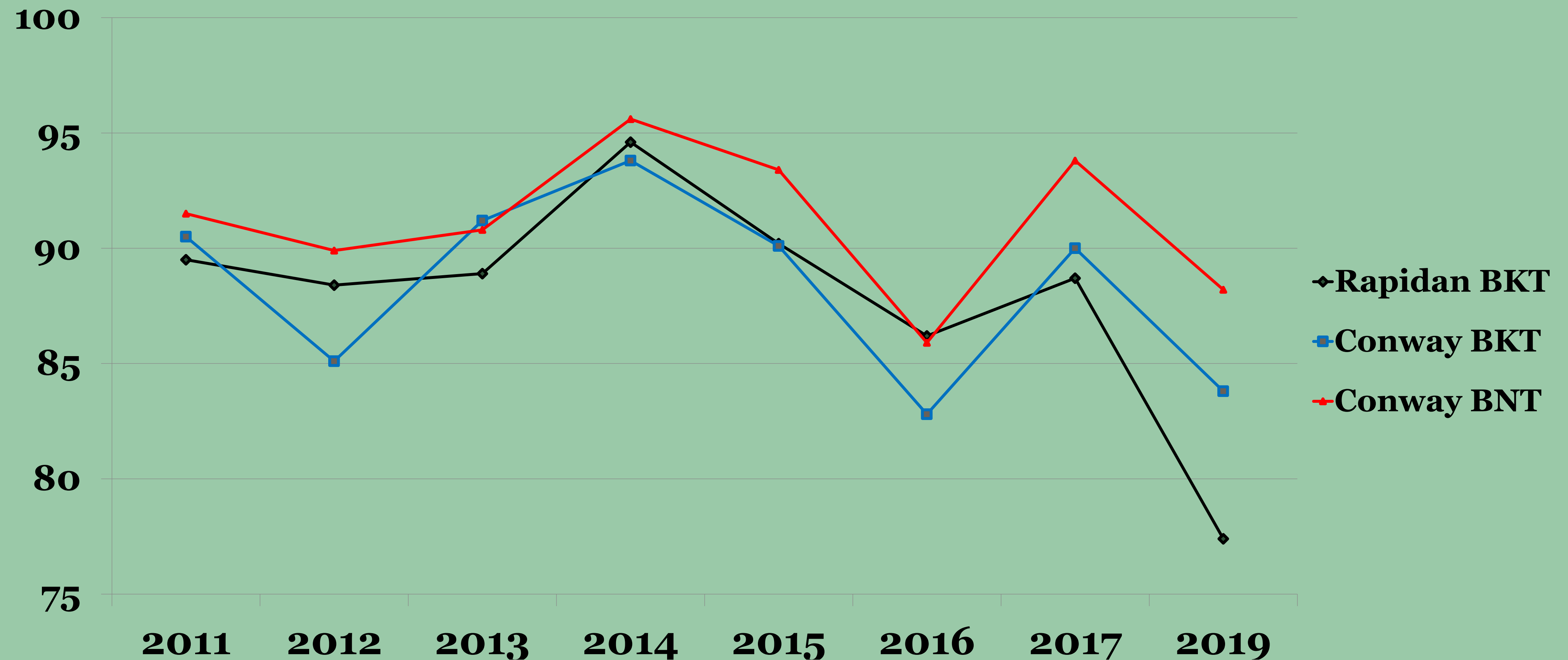
Rapidan River Brook Trout Abundance



Conway River Brook Trout Mean TL



Wr of BKT & BNT in Conway and Rapidan Rivers



Brook Trout “Response” to Brown Trout

- Nothing overt. Replicate streams would have helped.
- No decline in biomass or abundance.
- Unanticipated.



Recent relevant work on sympatric populations:

- Davis and Wagner (2016 TAFS) stressed the need to consider spatial scales and habitat partitioning.
- Kirk et al. (2018 TAFS) suggested impacts to BKT from BNT, but at lower elevations



**Torrent Sucker present only in Conway River.
American Eel, Blacknose Dace and Longnose Dace
present in both rivers.**



No significant trends in biomass of nongame species

Except for American Eel (increase in both streams) likely related to fall-line dam removal and improved fish passage.



Cautiously optimistic take home message:

In pristine, high elevation habitat; Brown Trout *may* be able to coexist with Brook Trout in some Virginia streams without causing overt impacts to the native salmonid.

