



Identifying Priority Areas for Wild Brook Trout Conservation with Newly Available Spatial Data Tools

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EBTJV Conservation Goals



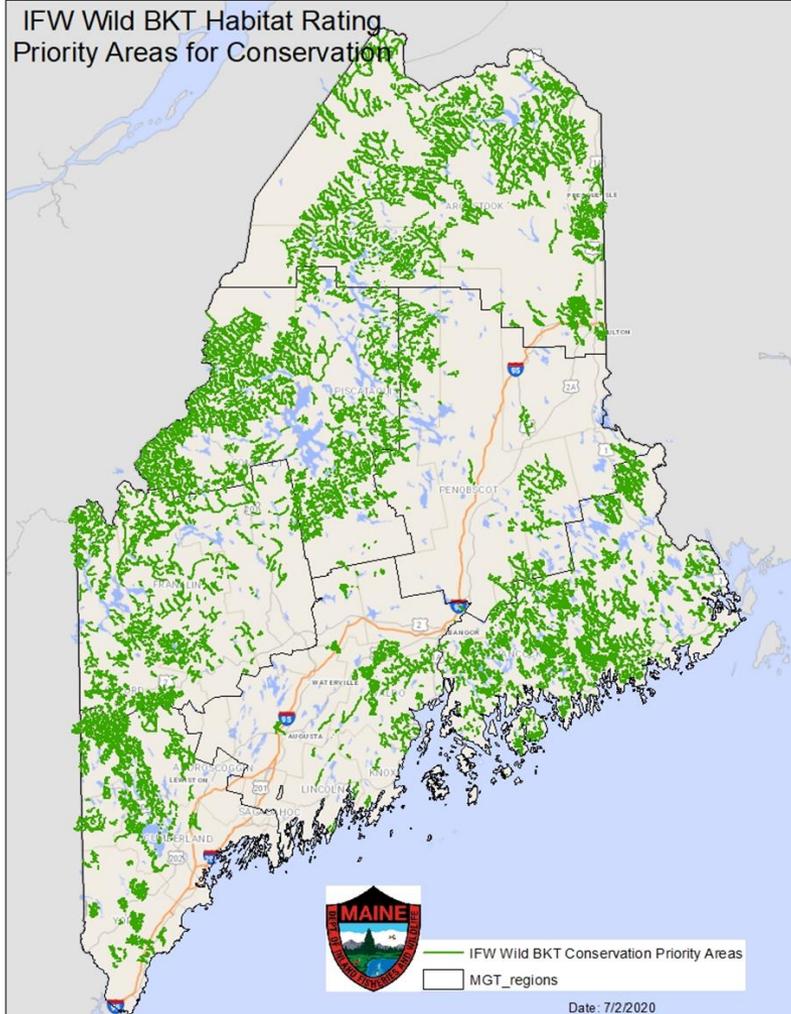
- **Conserve, enhance or restore wild Brook Trout populations that have been impacted by habitat modification, non-native species and other population level threats.**
 - *But where and how? Maine is a large state with no shortage of brook trout/coldwater fish habitats.*
 - *Develop priority areas that offer the best opportunities for protecting, enhancing or restoring wild brook trout populations.*
- **Encourage partnerships among management agencies and stakeholders to seek solutions to regional environmental and ecological threats.**
 - *Brook trout are a forest-dwelling species (for the most part). Let's try to keep it that way.*

Developing Priority Areas for Wild Brook Trout Conservation

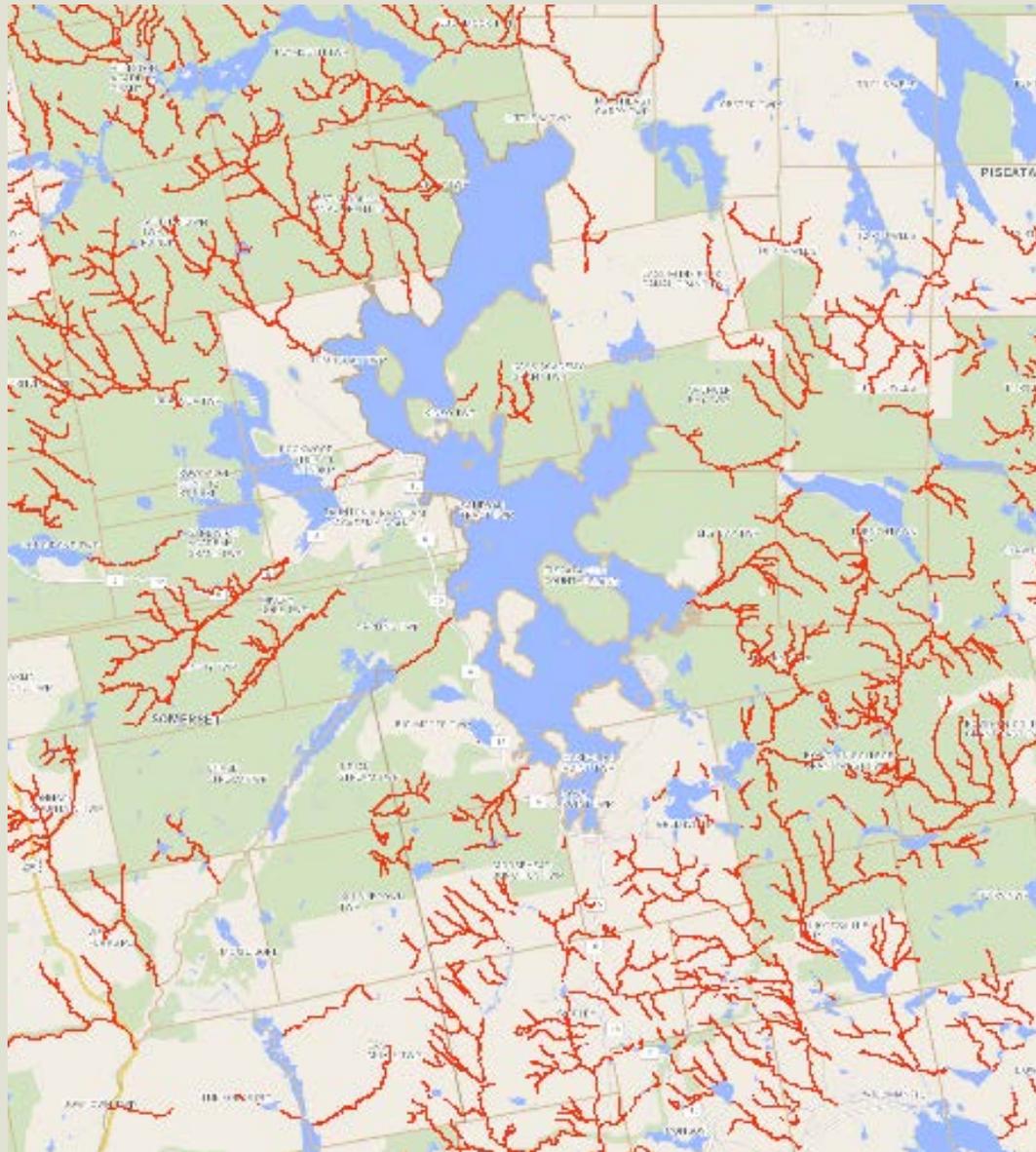


- **Identify the best current and potential future habitat for wild Brook Trout.**
 - *A synthesis of information gathered by IFW survey and assessment efforts AND knowledge and professional opinion of Regional Fishery Biologists.*
 - *Classify stream network areas according to overall habitat condition and existing brook trout population resources.*
 - *~35% of Maine's flowing waters classified as wild Brook Trout Habitats. Much of the 'unclassified' areas simply not known and warrant further assessment.*
 - *Very High and High value areas considered Priority Areas for Wild Brook Trout Conservation*
- **Primary intended uses: Guide stream connectivity enhancement and in-stream habitat restoration efforts.**

The map



- About 22% of Maine's flowing waters currently classified as Priority Areas.
- Data is sharable with our conservation partners as a GIS dataset.
- We are still exploring options for how best to share, but if interested, please contact Merry Gallagher for current options.



Climate Change Resiliency – where is it likely to maintain coldwater habitat conditions?



- Very much a work in progress!
BUT the Northeast Stream Temperature Model continues to improve.
- <https://www.usgs.gov/apps/ecosheds/ice-northeast/> or <http://ice.ecosheds.org/>
- Factors that affect stream temperatures:
 - Total drainage area, impounded area, % agriculture, % highly developed, % forested in 200 ft riparian buffer, precipitation (2 day), precipitation (30 day), air temperature, 7 day mean air temp

The Northeast Stream Temperature Model:



Model Equation

$$Temp_{huc,catchment,year,day} = X_{fixed}B_{fixed} + X_{huc}B_{huc} + X_{catchment}B_{catchment} + X_{year}B_{year}$$

$$T_{h,c,y,d} = X_f B_f + X_h B_h + X_c B_c + X_y B_y$$

The stream temperature model is a nested hierarchical Bayesian model that predicts daily stream temperature based on catchment characteristics and climate conditions. An early version of this model can be found in Letcher et al. (2016).



ICE Tool

Variable outputs available

Stream Temperature Model

Mean Summer Temp. (degC)

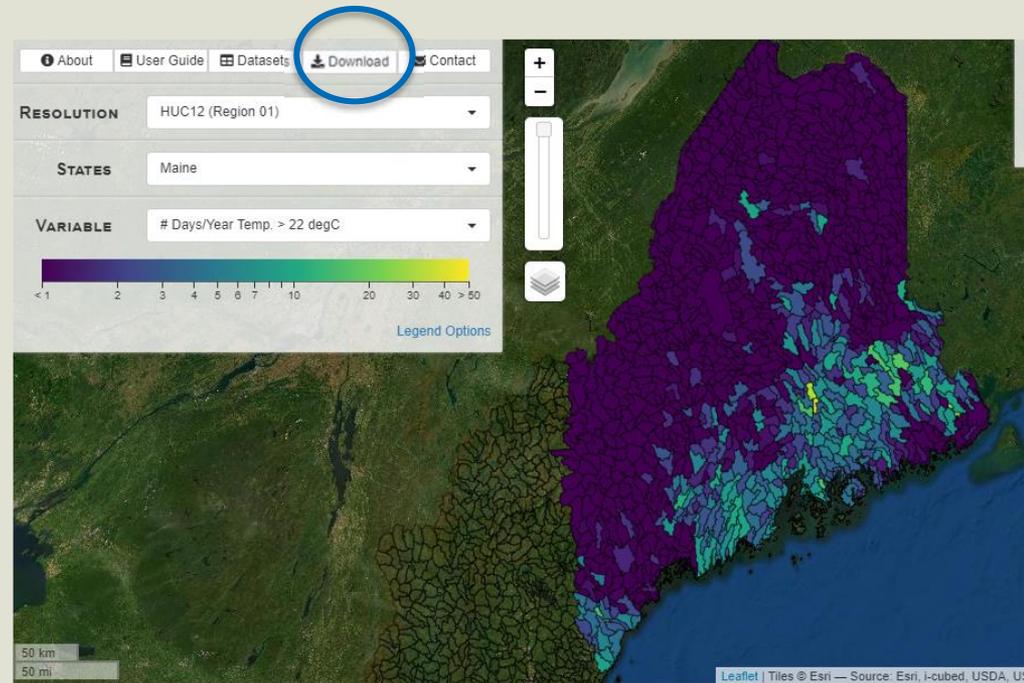
Mean Summer Temp. (degC) w/ Air Temp +2 degC

Mean Summer Temp. (degC) w/ Air Temp +4 degC

Mean Summer Temp. (degC) w/ Air Temp +6 degC

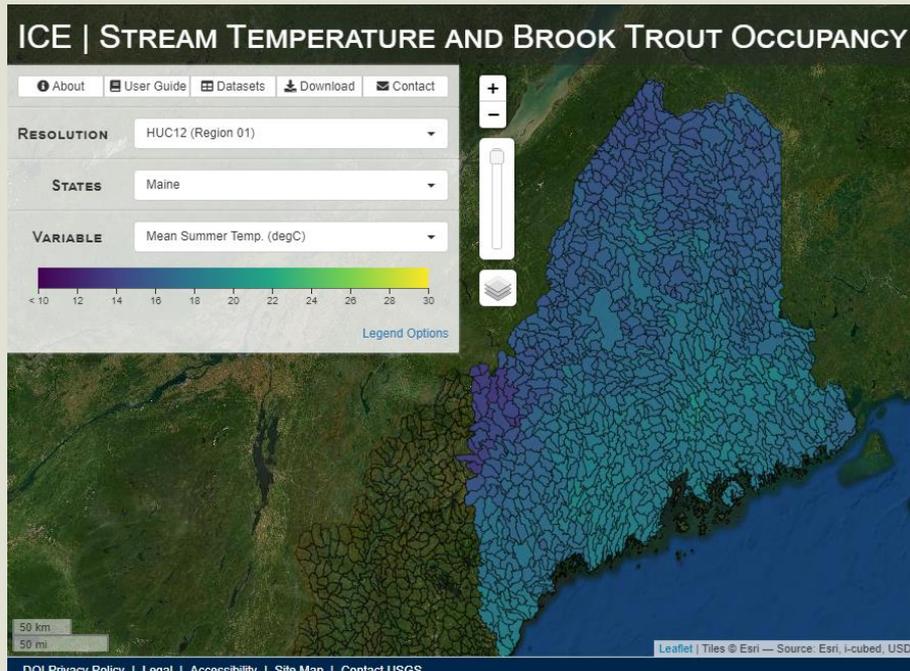
Days/Year Temp. > 18 degC

Days/Year Temp. > 22 degC

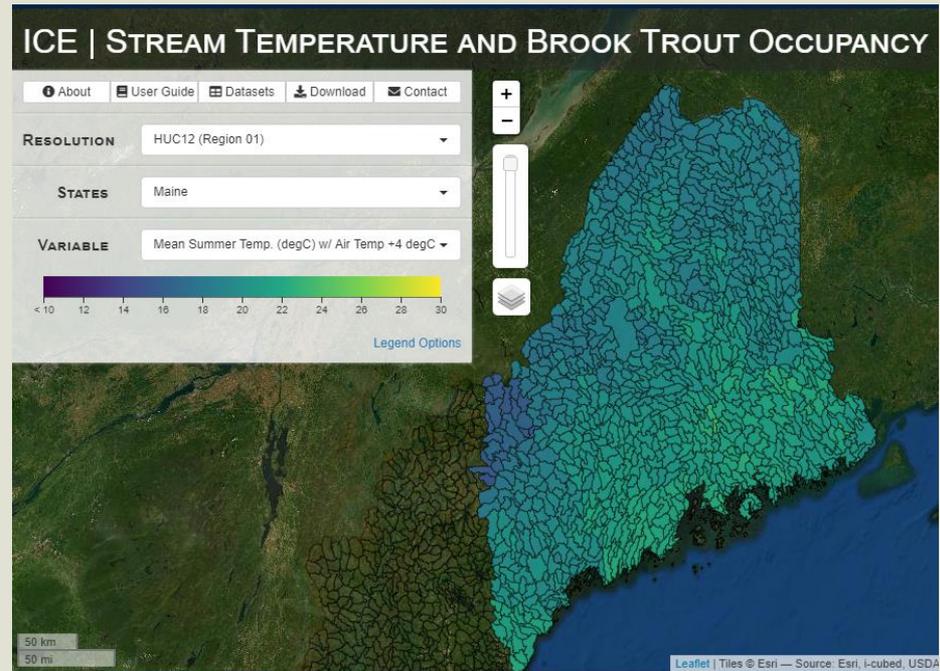




Example Comparison

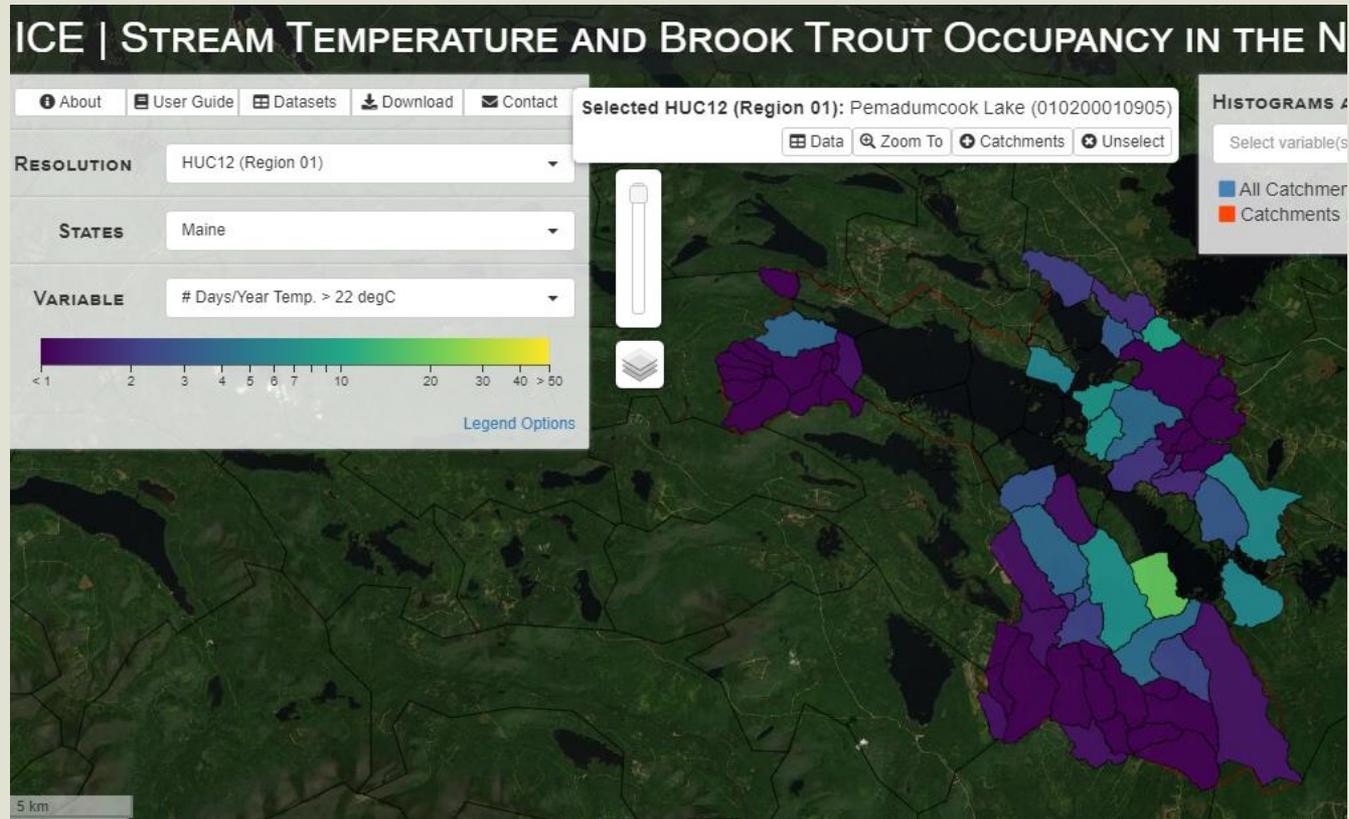


Current Conditions



+4 deg C climate warming scenario

Can drill down to finer scale units (catchments) to identify areas that may be disproportionately problematic.





Questions?

