



# Brook Trout Technical Work Group

Brook Trout Species Author:

Tim Obrey  
Fisheries Resource Supervisor  
Moosehead Lake Region

# Introduction



- The Eastern brook trout is Maine's most sought-after gamefish.
- The MDIFW recognizes the unrivaled historic and economic importance of our brook trout resources.
- Maine has several hundred lakes and ponds with populations of native and wild brook trout.
- There is also a long history of brook trout fish culture in Maine to provide fishing in waters where habitat limits or prevents the establishment of a wild population.
- Brook trout are extremely vulnerable to the effects of interspecific competition, particularly in the first two years of life.
- Brook trout are capable of extremely diverse growth rates depending on environmental factors such as productivity, water temperature, and food abundance.

# Introduction



## National Recognition

*From the 2006 Eastern Brook Trout Joint Venture:*

Maine is the only state with extensive intact populations of wild, self-reproducing brook trout in lakes and ponds, including some lakes over 5,000 acres in size. Maine's lake and pond brook trout resources are the jewel of the eastern range: lake populations are intact in 185 subwatersheds, in comparison to only six intact subwatersheds among the 16 other states.





# Management History

- Historically, most of Maine's inland waters were naturally suited for brook trout. However, beginning in the early nineteenth century, increases in human population growth, timber harvesting, agriculture, and industrialization led to a substantial decline in the amount of available brook trout habitat.
- There was no General Law bag limit on trout as late as 1910. At that time, there was a 25 pound limit and a 5 inch minimum length limit on trout. Beginning in 1920 there was a 25 trout limit, a 15 pound limit, and a 6 inch minimum length limit.



# Management History



- \* The first fly-fishing-only restrictions were imposed on individual waters in the Rangeley and Moosehead Lake areas near the end of the twentieth century.
- \* The General Law bag limit for brook trout in lakes was eventually lowered as biologists began to better understand the effects of over-harvest.
- \* In addition, categories of standardized special regulations, including bag and length limits were implemented to account for the variability in growth rates among trout waters and to standardize special brook trout regulations.

# Management History



- \* In 2005, the Maine Legislature enacted “An Act to Recognize and Protect the Native Eastern Brook Trout as one of Maine’s Heritage Fish.” This statute identified native brook trout lakes and ponds in Maine and established that (1) the Commissioner may not stock or issue a permit to stock fish in a lake or pond listed as a state heritage fish water, and (2) a person may not use live fish as bait or possess live fish to be used as bait on a lake or pond listed as a state heritage fish water.
- \* In 2013, the MDIFW developed a combined list (known as the Heritage List) of native and wild brook trout ponds that would be managed under the Heritage Fish rules.
- \* As of January 1, 2019, the Heritage List included 583 lakes and ponds distributed throughout the State of Maine.

# Management History

## Distribution of Heritage Fish Waters



Region	Number of BKT waters	Number of Heritage Waters	Percent
A	106	5	5%
B	73	0	0%
C	87	18	21%
D	240	118	49%
E	361	239	66%
F	140	81	58%
G	205	122	60%
Statewide	1,212	583	48%



# Management History



- \* In addition, and concurrent with the Heritage legislation, the MDIFW developed an Administrative Policy for managing native and wild salmonids. This policy, in addition to the statute and strategic plan, serve as the guiding documents for managing brook trout in Maine.
- \* In 2019, the MDIFW adopted a new General Law regulation that restricted the use of live fish as bait in many northern zone waters.





# Current Management



There are a wide variety of brook trout waters in Maine and therefore a wide variety of sampling methods are used to evaluate/monitor these populations.

- \* Clerk surveys are used on larger waters, especially those open to ice fishing.
- \* Voluntary census boxes or voluntary record books are used to collect catch data from smaller waters.
- \* Gillnetting can be used to collect age, growth, and food habits information.
- \* Trapnetting can be used to collect age and growth data, as well as the generation of population estimates in small ponds.
- \* Electrofishing is used in small streams to collect catch per unit effort and size distribution data and, in some cases, population estimates.
- \* More recently, the MDIFW has developed fish weirs to sample brook trout and salmon on large streams and rivers.

# Current Management



# Current Management



## Current Regulations focused on brook trout management:

### \* General Law includes:

- Statewide 6 inch minimum length.
- Statewide 5 fish bag limit in rivers, brooks, and streams.
- A 5 fish bag limit in lakes and ponds in the north region.
- A 2 fish bag limit in lakes and ponds in the south region.
- No live fish as bait in the north region.

### \* Specials include:

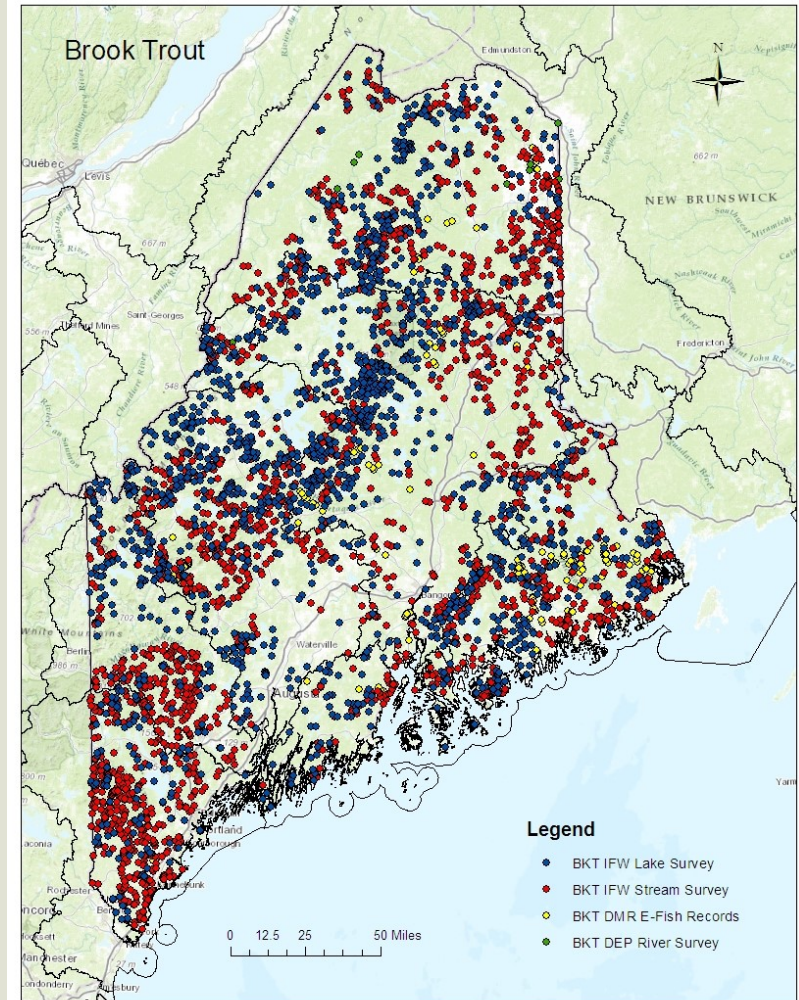
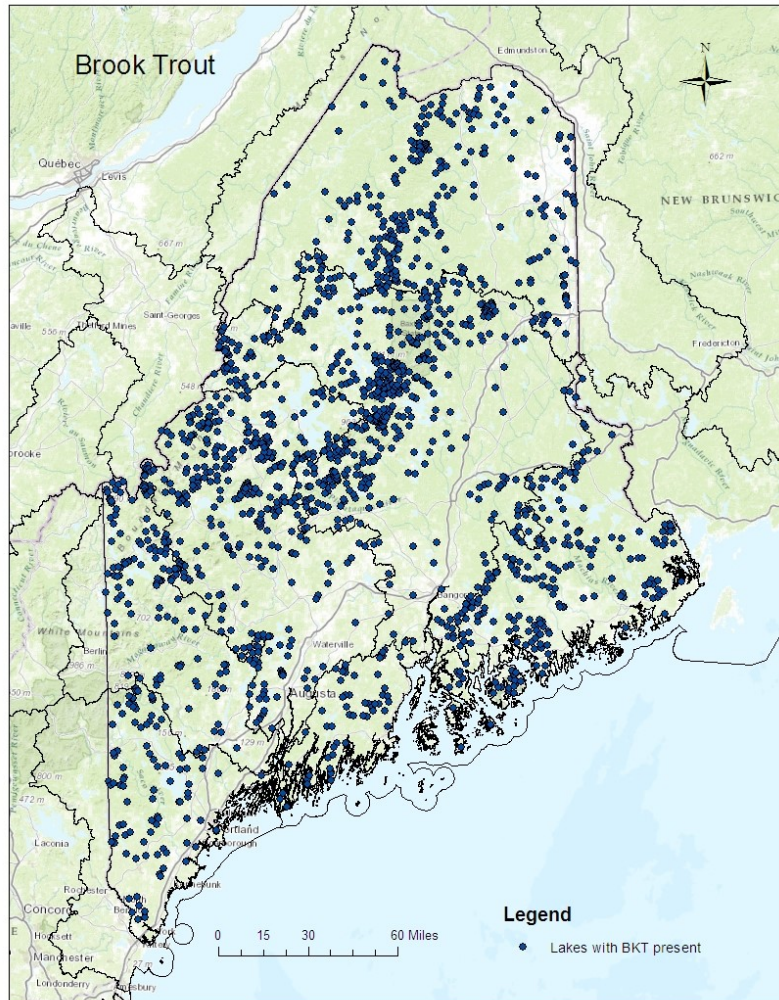
- Gear restrictions: NLFAB, ALO, FFO.
- Size/bag limits: S-7, S-16, S-17, S-18, S-19, S-20, and S-21.
- New experimental reg: Only one trout may exceed 14 inches.

# Current Distribution



Fishery Management Region	Number of brook trout lakes/ponds	Percent of Region's total lake/pond area	Number of lakes/ponds sustained by direct stocking	Percent of lakes/ponds sustained by direct stocking
A	106	16.1	94	88.7
B	73	34.3	72	98.6
C	87	7.6	66	75.9
D	240	75.3	104	43.3
E	361	71.4	88	24.4
F	140	19.6	41	29.3
G	205	84.6	43	21.0
<b>Statewide Total</b>	<b>1212</b>	<b>44.3</b>	<b>508</b>	<b>41.9</b>

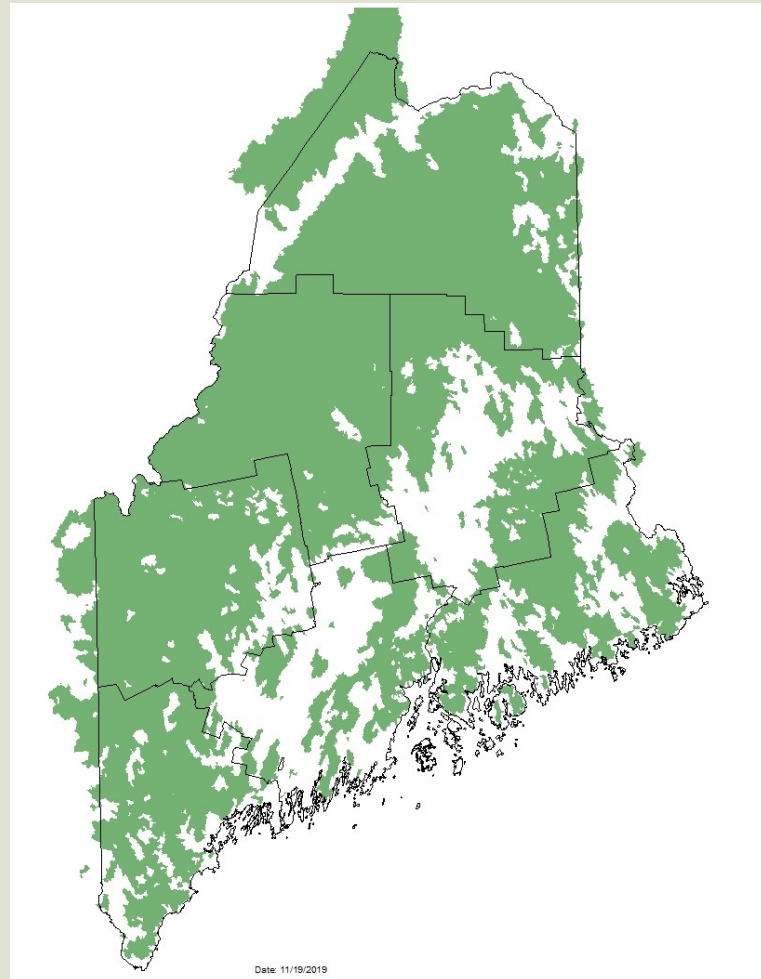
# Current Distribution



# Current Distribution



**Occupied wild brook trout habitat in Maine**  
– source EBTJV



# 2016 Angler Survey Summary



- The method most often used when fishing eastern brook trout was fly fishing (42%), followed by bait fishing (36%), trolling (24%), and spin fishing (24%).
- Those who fished for brook trout believe, on average, that a *quality* eastern brook trout needs to be a minimum size of 13 inches and that a *trophy* eastern brook trout needs to be a minimum size of 21 inches.
- Those who fished for brook trout most often targeted both wild fish and hatchery fish without distinction (61%), while 24% mostly targeted wild fish and 15% mostly targeted hatchery fish.
- A majority (59%) of ice fishing anglers prefer to fish for trout; with eastern brook trout being the most popular type (33%).

# Recent MDIFW Initiatives with Brook Trout



- \* NLFAB as General Law in northern region.
- \* Experimental regulation to simplify lawbook and protect larger brook trout.
- \* Restoration of the wild brook trout population in Thissell Pd.
- \* Utilizing Neosourdnahunk strain for waters stocked in Baxter State Park, including Thissell Pd.

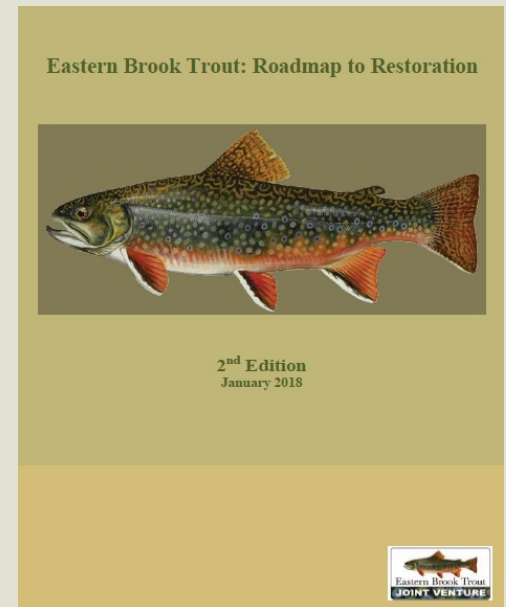


# Conservation Plans



*Conservation Plans currently being implemented with IFW collaboration and cooperation:*

- **Maine Wildlife Action Plan** - a multi-year planning process to develop a 10 year conservation plan for Species of Greatest Conservation Need and their Habitats
- **Eastern Brook Trout Joint Venture: A Fish Habitat Partnership** – An on-going, rangewide conservation effort for wild Eastern Brook Trout and Coldwater Fish Habitat



# Stressors – SGCN Fishes



- Common and recurrent stressors identified for SGCN fishes:
  - **Invasive and Other Problematic Species**
    - Ecological competition with large, predatory non-native or non-indigenous fish species
    - Habitat changes due to fish invader, ex. carp
  - **Pollution**
    - Effluents or run-off associated with agriculture or forestry actions, domestic or urban waste water
  - **Transportation and Service Corridors**
    - Effects on stream connectivity and habitat fragmentation, legacy effects of log-driving
  - **Residential and Commercial Development**
    - Land use change, effects on hydrology, deforestation
  - **Natural Systems Modifications**
    - Effects of dams or water-level management
  - **Climate Change and Severe Weather**
    - Temperature extremes, habitat shifting or alteration



# Stressors – Freshwater Habitats

- Common and recurrent stressors identified for Aquatic Habitats:
  - **Lakes and Ponds**
    - Effects associated with non-native, non-indigenous or invasive species
    - Domestic and urban waste water discharge
    - Dams and water-level management
  - **Rivers and Streams**
    - Connectivity and fragmentation: roads, dams, railroads
    - Forest, riparian and hydrologic effects due to logging and wood harvesting
    - Effects due to Climate Change: storms, flooding, habitat shifting, thermal extremes, drought
    - Sedimentation, effluents or run-off associated with agriculture or forestry actions; industrial, domestic or urban waste water
    - Development, land-use change
    - Effects associated with non-native, non-indigenous or invasive species
    - Mining and quarrying



# Conservation Actions – Freshwater Habitats

- Streams, Rivers, Lakes and Ponds:
  - **Habitat Restoration and Connectivity**
    - Address passage barriers and constraints
    - Research and develop new technologies to facilitate fish passage
    - Dams, water-level management and ecological flows
    - Continue efforts such as Stream Smart
    - Improve riparian management or condition
  - **Invasive and Non-native Species**
    - Outreach and education efforts
    - Expand inspection programs – boats, gear, pet trade
    - Improve enforcement
    - Expand reclamation, suppression and control efforts
  - **Water Quality**
    - Continue improving water quality and reducing effluent or septic discharges

# Eastern Brook Trout Joint Venture – Conservation Strategy



**The vision of the Eastern Brook Trout Joint Venture is to ensure healthy, fishable wild Brook Trout populations throughout their historic eastern U.S. range.**

## *Key Conservation Actions:*

- **Increase recreational fishing opportunities for wild Brook Trout**
- **Conserve and increase habitats that support robust wild Brook Trout populations**
- **Restore and reconnect suitable habitats adjacent to robust wild Brook Trout populations**
- **Conserve genetic diversity of wild Brook Trout populations**
- **Conserve unique wild Brook Trout life history strategies (e.g., lacustrine populations, large river populations, and coastal populations)**
- **Minimize threats to wild Brook Trout populations (e.g., degraded water quality, invasive species, altered hydrologic regimes)**



# Habitat Condition

- Getting warm

Table 3. Average water temperatures during the summer months (°F). Lethal temperatures ( $\mu$ 77°F.) bolded.

River/Stream	Year	River mile	Elevation <sup>2</sup>	Order	Statistic	Month		
						June	July	Aug.
Alder Brook	2005	2.3	1,230	2	Minimum	49	56	55
					Mean	58	64	63
					Maximum	71	73	71
Austin Stream	2005	10.8	1,000	3	Minimum	53	61	62
					Mean	64	72	68
					Maximum	79	81	78
Austin Stream (South Branch)	2005	2.1	1,020	3	Minimum	52	58	57
					Mean	64	68	66
					Maximum	79	80	77
Bemis Stream	2003	3.7	2,440	2	Minimum	43	52	54
					Mean	54	61	61
					Maximum	73	72	68

From: F. Bonney (2009) Western Maine River Morphology (IFW report)



# Habitat Condition

- Physical habitat

Table 12. Pool frequency by stream type and order. Distances in feet.

Rosgen class	Order	Number of pools	Stream length	Distance between pools	Bankfull widths between pools	
					observed	expected <sup>1</sup>
A1	3	3	1,037	346	10	.
A4	1	18	7,800	437	22	.
B2	4	2	1,962	981	14	4-5
B3	2	9	7,080	787	36	4-5
B3	3	3	2,800	933	19	4-5
B3a	2	2	2,000	1,000	36	4-5
B4	4	5	8,820	1,764	15	4-5
B4a	1	4	3,000	750	40	4-5
B4a	3	43	7,820	182	5	4-5
C2	3	5	1,800	360	8	5-7
C3	2	47	31,881	678	21	5-7
C3	3	21	7,075	337	12	5-7
C4	1	73	7,880	108	9	5-7
D4	2	4	2,880	720	31	.
D4	3	14	2,420	173	5	.
F4	3	29	54,752	1,888	26	.

Table 10. Habitat characteristics by reach. Measurements in ft and ft<sup>2</sup>.

Stream class	order	length	Mean			Cover (%)		stream	pool	% pool
			width	depth	shade	slurb				
Ala+	4	1,440	63.3	2.1	41	10	63,167	664	1.1	
A1	3	2,619	31.0	0.9	29	67	273,055	16,918	9.3	
A2	3	4,500	44.2	1.1	47	41	199,050	38,520	19.4	
A4	1	7,800	20.2	0.5	66	23	157,560	8,370	5.3	
B2	3	2,275	60.5	0.9	42	31	126,290	11,340	9.0	
B2	4	1,962	68.6	1.7	36	31	133,703	6,093	4.6	
B2a	2	5,846	30.9	0.8	42	35	74,775	31,755	42.5	
B3	2	7,080	21.6	0.5	65	17	152,928	20,855	13.6	
B3	3	6,627	49.2	1.0	37	28	333,612	1,729	0.5	
B3	4	3,909	62.3	1.6	9	16	243,531	149	0.1	
B3a	2	2,000	28.0	0.5	49	6	56,000	1,680	3.0	
B3c	4	11,200	68.2	1.1	9	36	725,210	89,890	12.4	
B4	1	7,880	20.9	0.7	73	30	141,140	24,400	17.3	
B4	3	8,283	42.3	1.0	30	22	852,015	63	0.01	
B4	4	8,820	118.2	1.5	2	12	1,042,524	19.1	0.2	
B4a	2	6,100	18.8	0.4	18	19	114,680	71	0.1	
B4a	3	7,820	44.3	0.6	55	14	340,094	0	0	
B4c	3	10,050	27.8	1.2	.	.	279,390	21,235	7.6	
B4c	4	3,850	75.7	1.5	56	10	357,105	440	0.1	
C2	3	1,800	47.4	1.2	40	82	85,320	22.1	0.03	
C3	2	32,280	33.1	0.7	37	71	1,068,468	124.6	0.01	
C3	3	13,091	32.6	0.9	25	71	432,302	40,716	9.4	
C3	4	14,907	80.0	1.7	3	47	1,060,916	342,921	32.3	
C4	3	3,278	27.7	0.6	38	19	278,037	160,000	57.5	
C4	4	9,523	56.1	1.4	28	12	534,240	1,219	0.2	
C5	3	5,150	40.7	0.7	36	60	266,110	91,275	34.3	

Low number of pools

Large distances between them

Low overall percentage of pool habitat

From: F. Bonney (2009) Western Maine River Morphology (IFW report)



# Native Fish Conservation Initiatives

- Stream Connectivity Improvement

The screenshot shows the Maine Department of Environmental Protection website. The main heading is "Stream Crossing Upgrade Grant Program". Below the heading, it states: "Maine voters approved multiple bond packages that include \$5 million dollars annually for municipal stream crossing upgrades. These monies fund a competitive grant program that matches local funding for the upgrade of municipal culverts at stream crossings to improve fish and wildlife habitats and increase community safety." It also provides contact information for John MacLaine. A sidebar on the left lists various categories like "Permits, Licenses, Certifications", "Programs", "Laws", "Rules", "Publications and Resources", and "Monitoring and Reporting".



## STREAM SMART



Stream Smart works with contractors, landowners, and other professionals responsible for road-stream crossings to construct culverts that maintain fish and wildlife habitat while protecting roads and public safety.

The screenshot shows the "Maine Stream Habitat Viewer" web application. The interface includes a search bar, a map of Maine with numerous colored markers (red, orange, yellow, green, blue) representing different stream features, and a legend on the left. The legend categories include "Crossings & Barriers" (Barrier, Potential Barrier, No Barrier, Unknown), "Priority Habitats" (Atlantic Salmon, Alewife, Sea-Run Rainbow Smelt, Wild Eastern Brook Trout, Tidal Marshes), and "Other Habitats" (Dams, Natural Barriers, Impassable Waterfalls). The map also shows town names and geographical features.





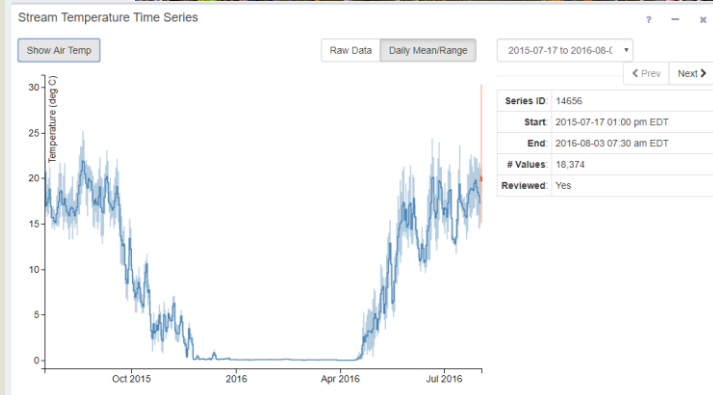
# Native Fish Conservation Initiatives

- Stream Temperature Monitoring and Modeling



A screenshot of the SHEDS Stream Temperature Database Data Viewer interface. The interface includes a navigation menu on the left with options like Home, Public Data Viewer, Manage Data, Maine WITWG, Overview, Data Viewer, Batch Download, My Account, and Contact Us. The main content area shows a "Data Viewer" for the "Maine Water Temperature Working Group". It features a "Station Map" with a legend for Active (blue), Inactive (grey), Planned (orange), Unknown (red), and Selected (red) stations. To the right, "Station Details" for "MEFW: Allagash 05" are displayed, including Agency, Name, Description, Latitude, Longitude, Status, Public status, and Created date. There are also buttons for "Zoom To", "View Data", and "Download Data".

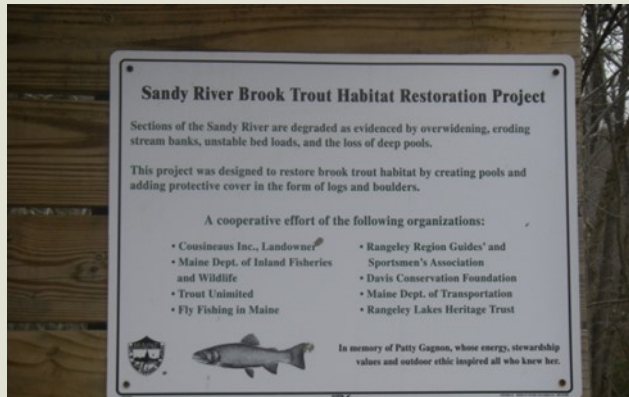
A screenshot of a web-based map application. The interface includes a top navigation bar with "About", "User Guide", "Datasets", "Download", and "Contact". Below this, there are dropdown menus for "RESOLUTION" (set to HUC12 (Region 01)), "STATES" (set to Maine), and "VARIABLE" (set to # Days/Year Temp. &gt; 18 degC). A color scale legend is shown below the variable dropdown, ranging from 1 to 200. To the right, there is a "HISTOGRAM" section with "Select" and "All C" options. The main map area shows a map of Maine with stream networks overlaid, colored according to the temperature variable. A scale bar at the bottom left indicates 50 km and 50 mi. The bottom right corner has the text "Leaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX".





# Native Fish Conservation Initiatives

- Instream Habitat Improvement



## Opportunities for Cold Water Fisheries Habitat Enhancement Associated with Forestry Operations in Maine

### Placing Large Wood in Streams



Wood addition project on Cook's Brook in Lyman



Maine Department of Agriculture, Conservation and Forestry  
Maine Forest Service  
April, 2013

Adapted from Oregon Guide to Placement of Wood, Boulders and Gravel for Habitat Restoration, Oregon Department of Forestry 2010. And a Supplemental Guide for Large Wood Additions to Streams to Enhance Stream Function and Fish Habitat with Particular Focus in Downeast Maine, Ben Neumann 2011

# Group Discussion



**We want to hear  
from YOU!**

Resource needs?

Management needs?

Threats?

Where should the Dept  
be focused?