

Agricultural Water Use and River Stress in Massachusetts

Project Objective

The goal of this analysis is to characterize agricultural water use in Massachusetts, and determine whether or not the areas with most intense water use overlap with areas already experiencing stress on their water resources

Background

Approximately 20% of farms in Massachusetts use irrigation. Since the 1970's, the rate of increase in irrigated farms has outpaced the general increase in farm numbers. Between 1974 and 2007, the total number of farms in the Commonwealth grew by 55% while the number of irrigated farms grew by over 85%.

The Massachusetts Department of Environmental Protection (DEP) carries out permitting for the Water Management Act (WMA). Under WMA, any entity withdrawing directly from surface or groundwater sources must be licensed if they reach the minimum threshold. As of February 2009, 42% of licensed water users were classified as agricultural; about 9% of authorized withdrawals were for agricultural use. Most of the agricultural users with WMA permits are held by cranberry growers, who use water for irrigation, frost protection, and harvest (shown at right).

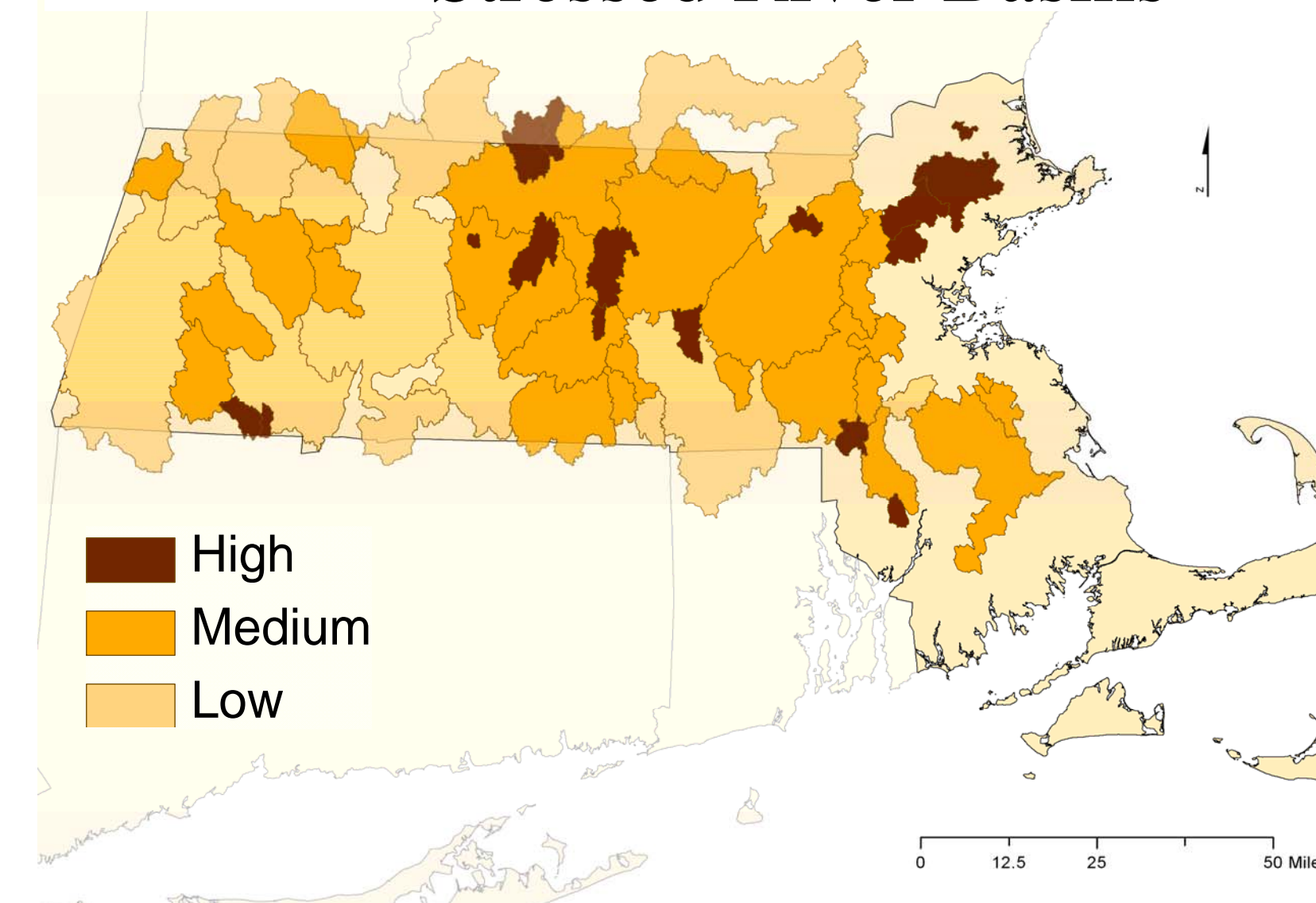


Many communities are already experiencing water stress. As of September 2008, over 70 towns had voluntary or mandatory water use restrictions in place. The 2001 *Stressed Basins in Massachusetts* report identified a preliminary list of stressed river basins in the Commonwealth, based on water quantity, water quality, or habitat degradation indicators. Quantity indicators are used to determine the level of hydrological stress. The classifications are intended to be used to flag areas of concern that warrant further study and initial steps to conserve water resources.

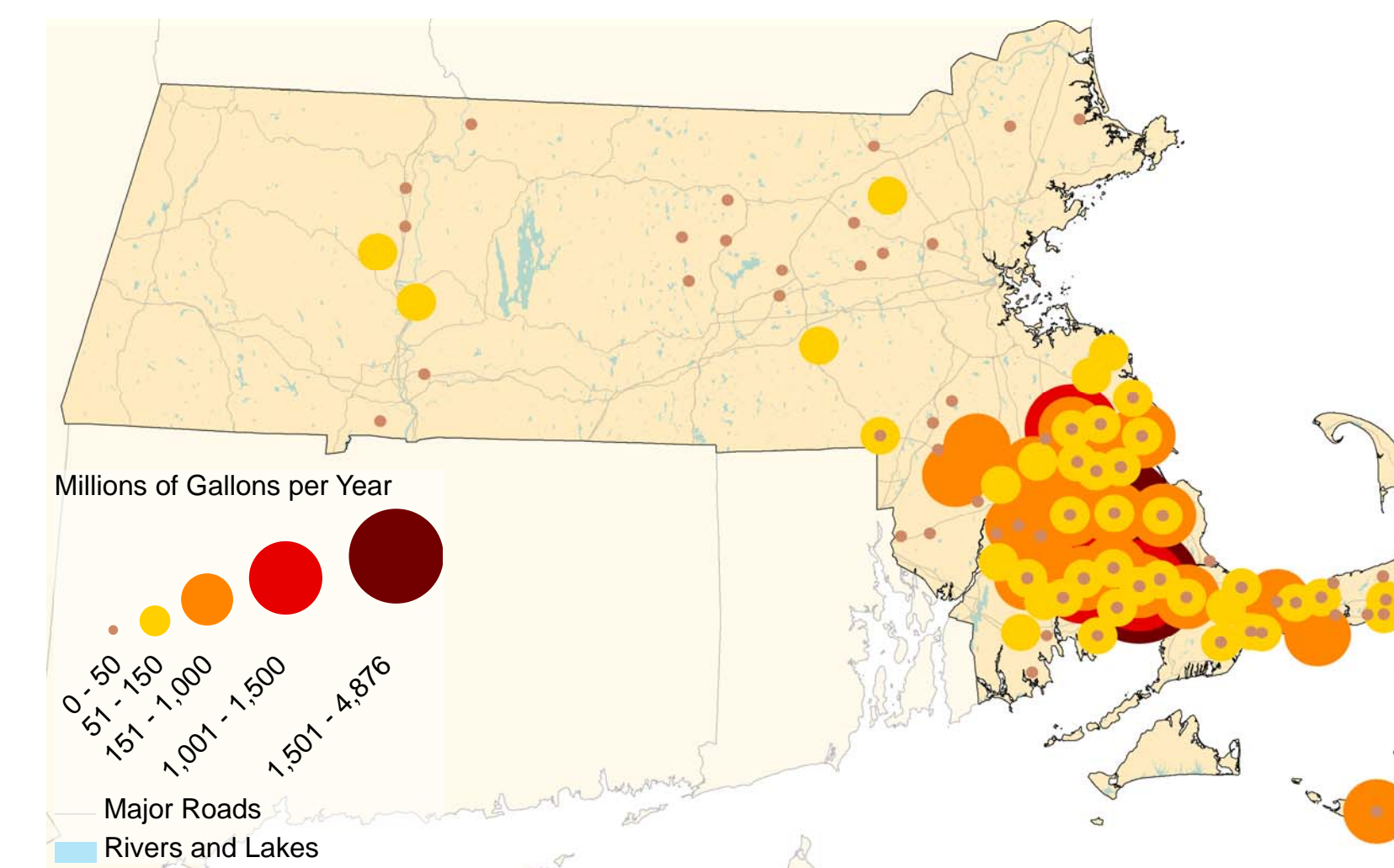
Methodology

This analysis combines data on stressed river basins with information on water withdrawal permits and land cover to identify areas where agricultural water use may overlap with areas experiencing water stress.

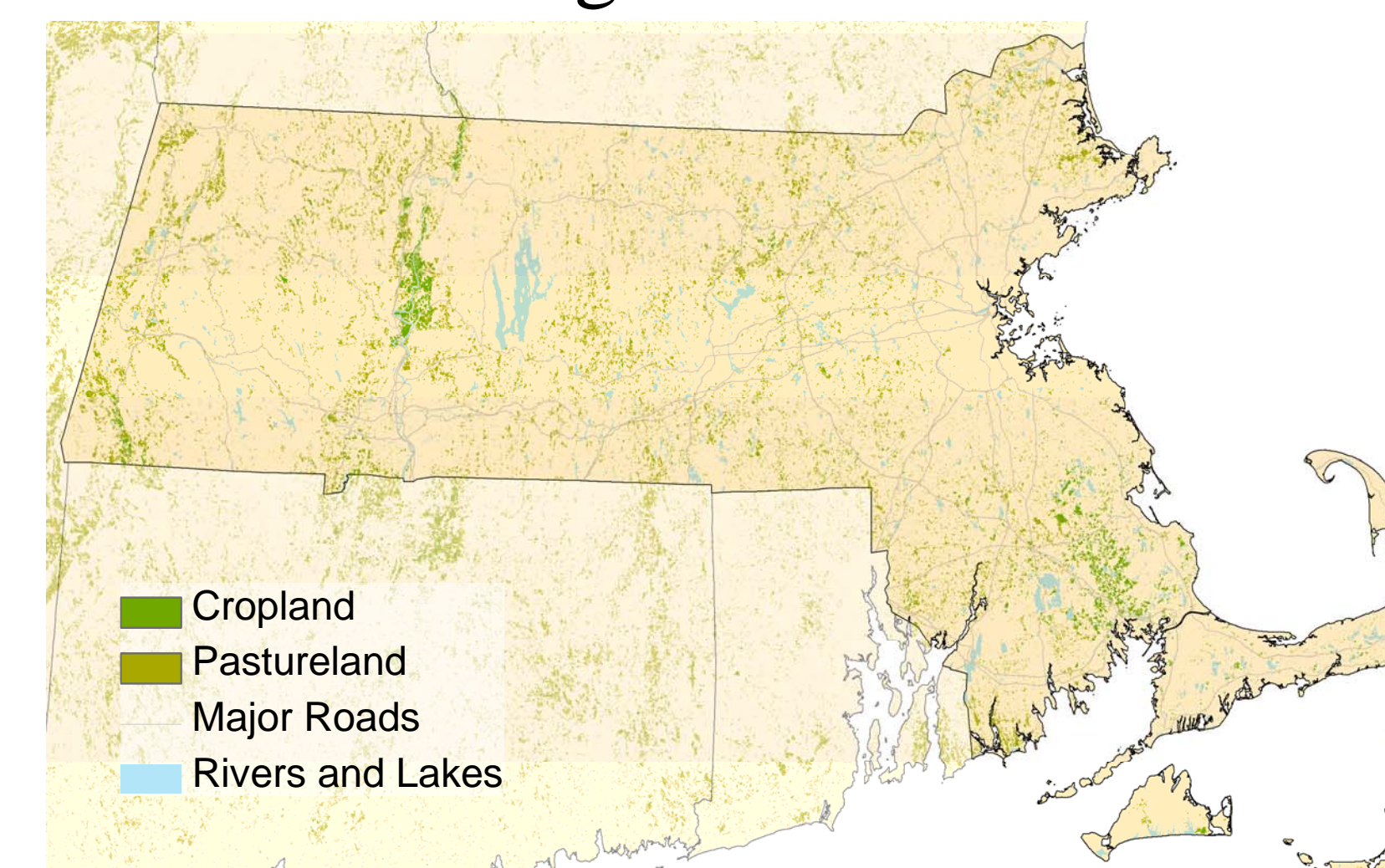
Stressed River Basins



Water Withdrawal Permits



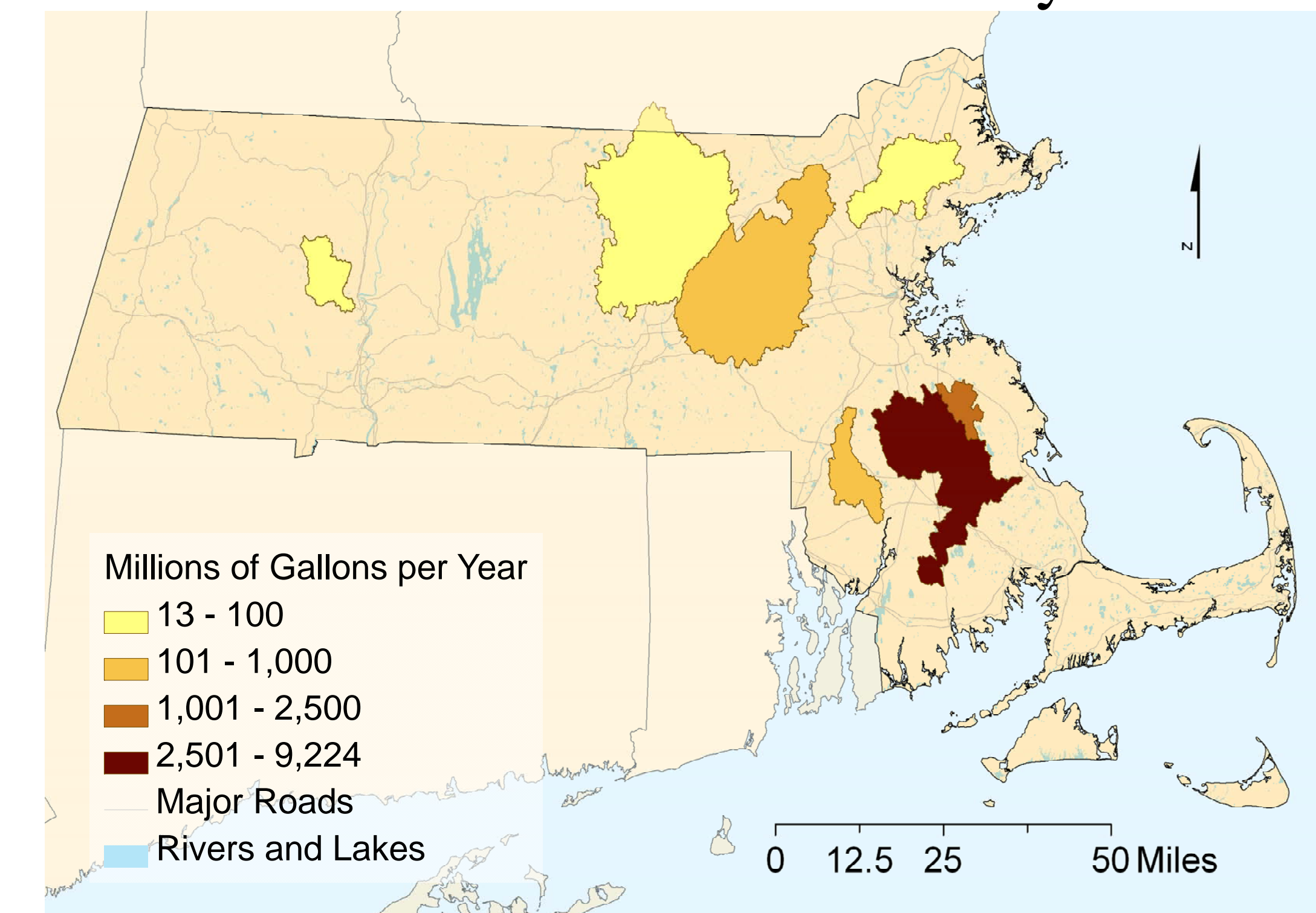
Agricultural Land



Results

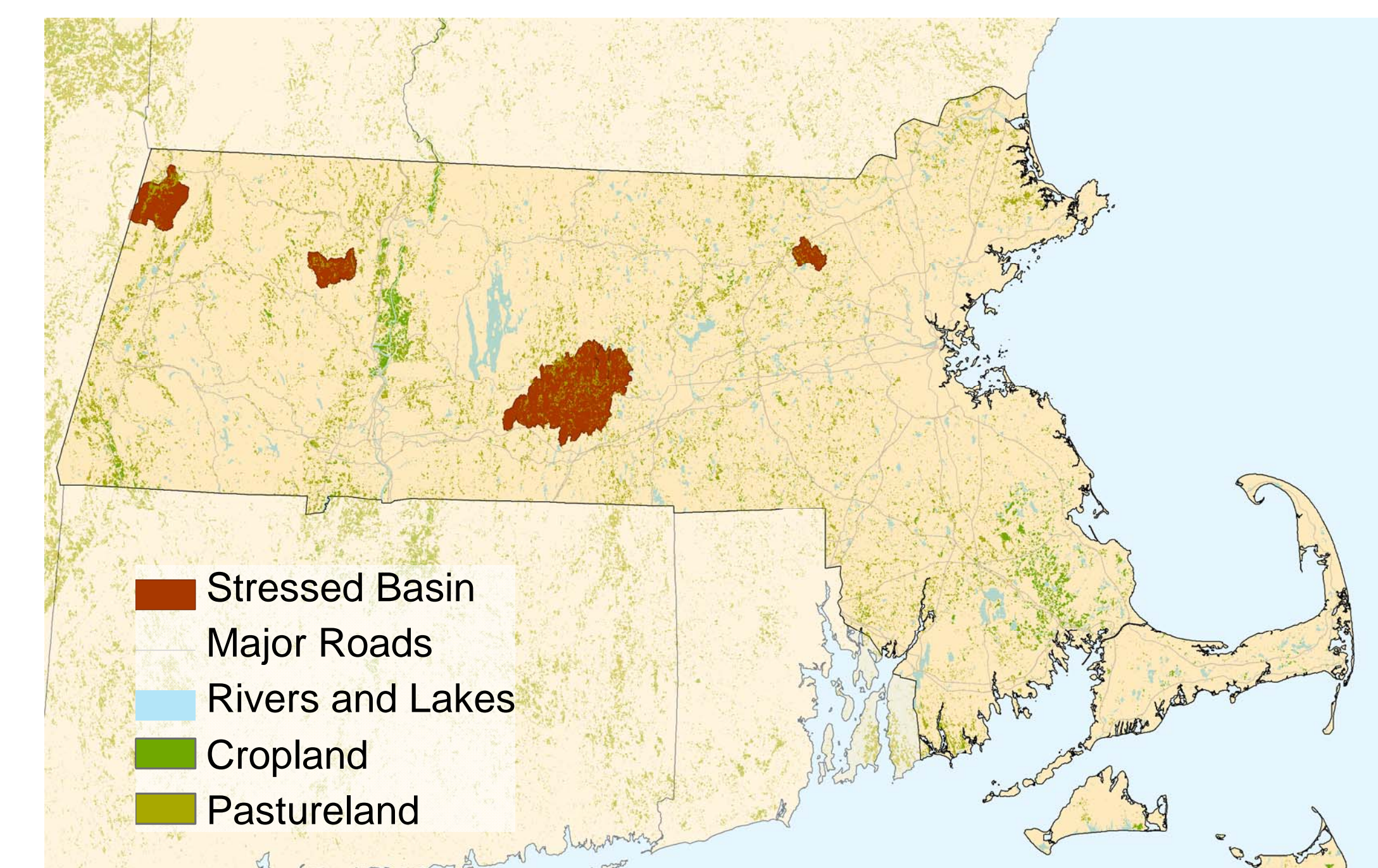
Several river basins identified as being under high or medium stress contain farms with water withdrawal permits. These basins are shown below, classified by the amount of water permit holders located within the basin are allowed to withdraw each year.

Annual Water Permit Amounts by Basin



About one quarter of all farms with irrigation are licensed to withdraw ground or surface water by DEP. In order to estimate basins that have a relatively high potential for future irrigation, agricultural land was aggregated by river basin. The map below identifies those river basins where at least 10% of land cover is classified as agricultural land, but do not currently have any farms with water withdrawal permits.

Stressed Basins with Agricultural Land



Data Sources

Massachusetts Department of Environmental Protection (2009)
Massachusetts Department of Conservation and Recreation (2001)
USGS Land Cover Institute (2001)

Projection: NAD 1983 Massachusetts State Plane Mainland

Cartography

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Photo courtesy of Angel Park