New York State **Aquatic GAP Analysis**

As part of the the Great Lakes Aquatic Gap project, scientists at the Tunison Lab of Aquatic Science are assembling a stream fish and habitat database for the entire state of New York. This dataset will be suitable for answering innumerable questions about streams, watersheds, and the creatures that live there. The habitat attributes are calculated on five spatial scales (Fig.1) for every stream segment in each of the major drainages (Fig.2). Descriptive stream metric variables are coupled with landscape scale enduring features resulting in a list of 300+ habitat variables for fish modeling and other analysis (Table 1). Habitat processing is nearing completion (Fig.3) and fish modeling is well under-way in the Great Lakes processing area.

Fig.1

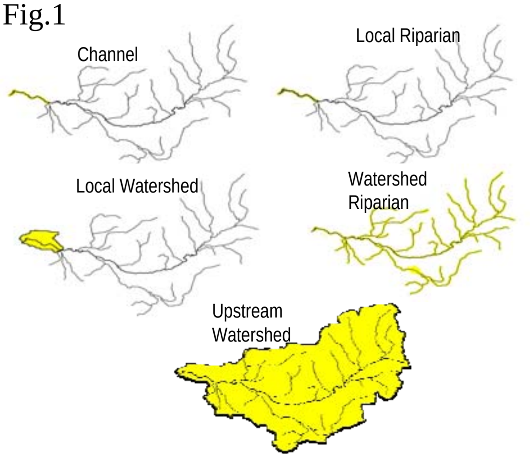


Table 1. Landscape features =

C = Channel R = Riparian RT = Riparian Total W = Watershed WT = Watershed Total

	Scale	Description
Stream Metrics		
UPSTREAM_LENGTH	RT,WT	Distance to upper most input water of watershed
LENGTH	C	Length of reach segment
STRAHLER	C	Strahler stream order
SHREVE	C	Shreve stream order
LINK	C	Shreve stream order upstream link
DOWNORDER	C	Strahler stream order of downstream segment
DLINK	C	Shreve stream order of downstream link
SINUOUS	C	Sinuosity (from Rosgen)
GRADIENT	C	Gradient as decimal
AVERAGE_ELEV	C	Average Elevation above sea level
DOWN_LENGTH	C	Distance to lower most receiving water (Great Lake)
Ecoregion	C,R,RT,W,WT	Omernik's Level III Ecoregions
Stewardship	C,R,RT,W,WT	Standard GAP designations of Land Stewardship
Landuse	C,R,RT,W,WT	NLCD 92 Landcover
Surficial Geology	C,R,RT,W,WT	Landform Domain and Texture
Bedrock	C,R,RT,W,WT	Bedrock type
Depth to Bedrock	C,R,RT,W,WT	Quaternary sediment thickness
Slope	R,RT,W,WT	Mean Slope
Soil Permeability	R,RT,W,WT	Mean soil permeability (in/hr x 100)

Fig.2

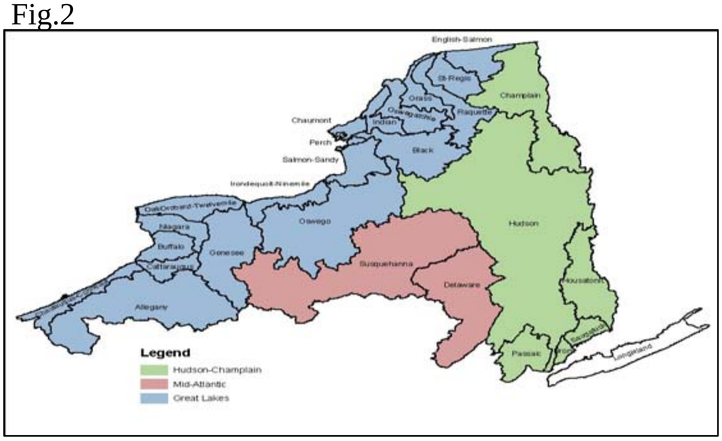
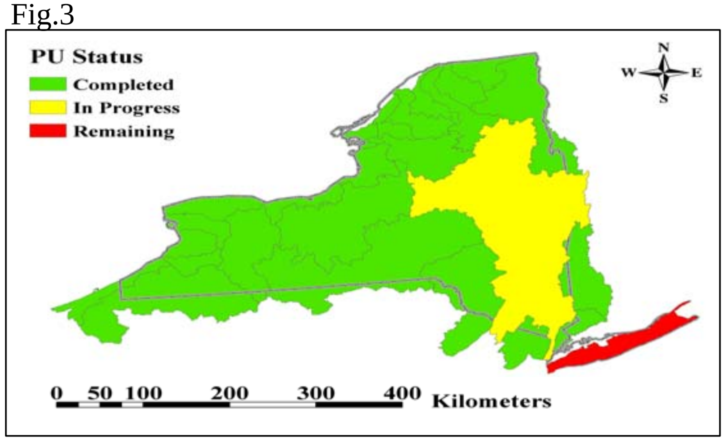


Fig.3



Fish observations were gathered from the NYS Fisheries database release14 (Fig.4). CPUE was calculated for active gear types and used to build Neural Network models predicting broad categories of abundance for each species (Fig.5). The habitat variables used to build the models were objectively selected using CCA. Results have been favorable with $r^2 > 0.90$ in most cases.

Fig.4

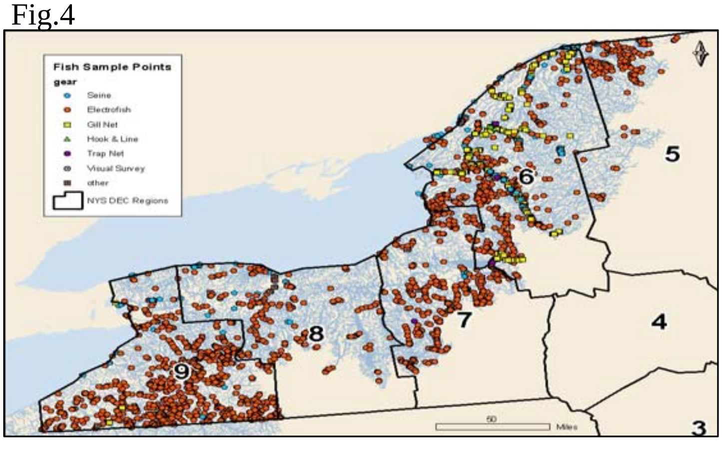
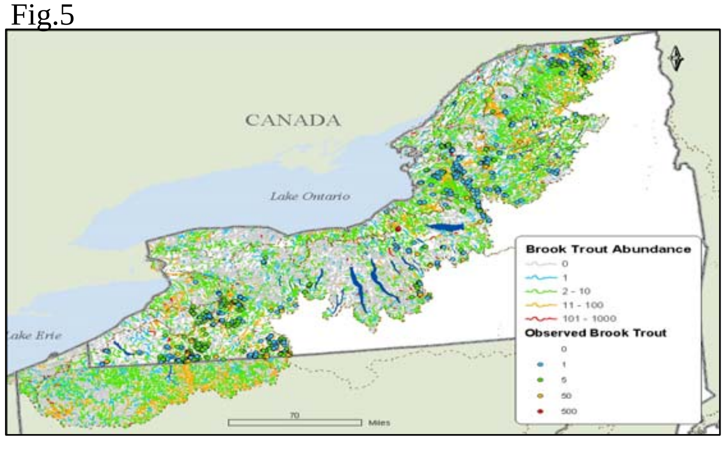


Fig.5



Derivatives of fish model creation include identification of optimum habitat for desirable gamefish (Fig.6) and summer stream temperature predictions (Fig.7), both of which were difficult, if not impossible, at the landscape scale in NYS before aquatic GAP analysis.

Fig.6

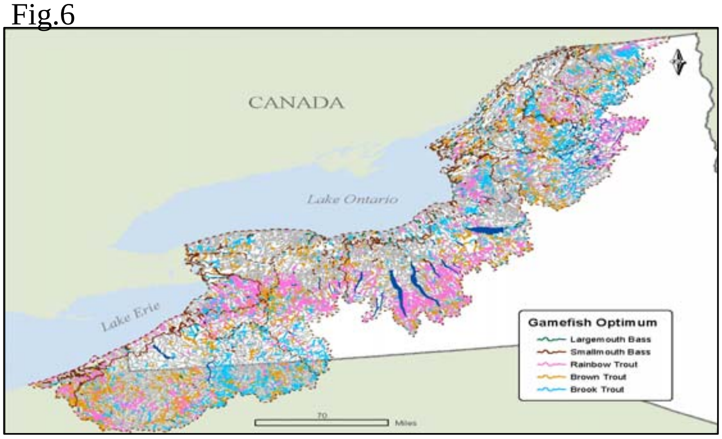
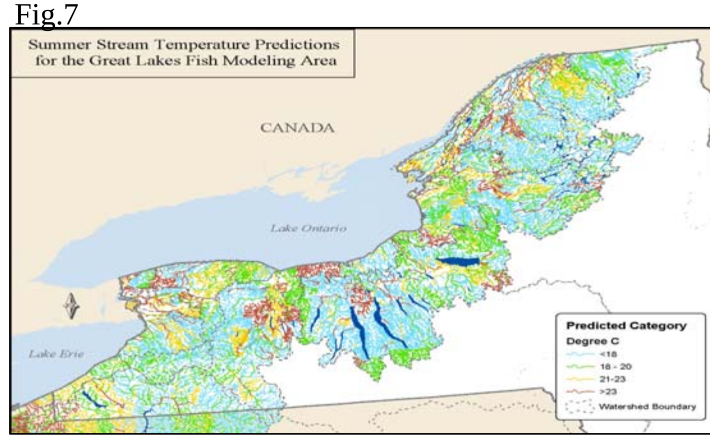


Fig.7



Further analysis has led to studying fish biodiversity as it relates to landuse types and land stewardship classification (Fig.8). A separate project, based on GAP analysis data, is a Stream Restoration Suitability Index (Fig.9). Stream quality and restoration feasibility are combined to create a suggestion of potential sites for stream restoration. This index can be applied to any area of interest to managers.

Fig.8

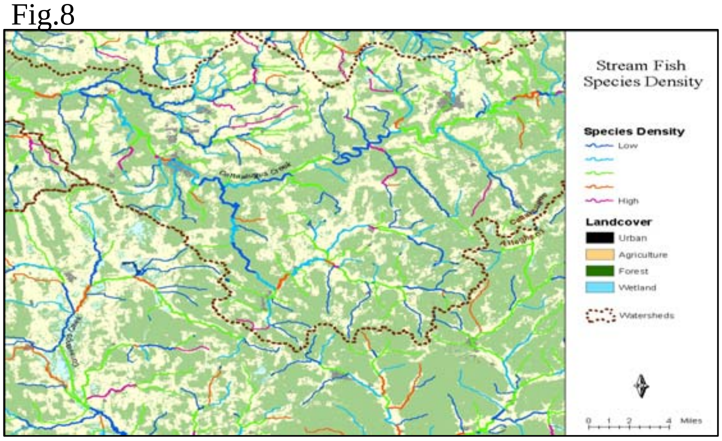
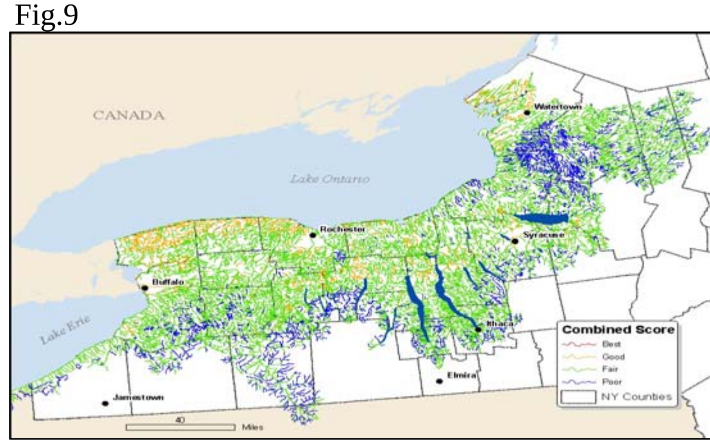


Fig.9



As we near completion of the project, we are excited about using this tool to assist managers in making decisions concerning our aquatic natural resources. For more information about Aquatic GAP and the Coastal GAP projects contact:

Jim McKenna Tunison
Laboratory of Aquatic Science USGS / Great
Lakes Science Center Phone: (607) 753-9391 x21
Email: jemckenna@usgs.gov

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