Natural Resources Report for the Joint Use Land Study City of Auburn Maine

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1.0 Introduction

The analysis of the study area consisted of a literature and data search, GIS data processing and analysis, and a field reconnaissance in 5 areas of interest within the project area. The literature and data search involved obtaining available published data on the study area including soil mapping, habitat mapping, cultural resources, published topographic information, and information of significant wildlife habitats documented within the study area. Specific sources used are discussed in Subsection 2.1 and the results of the literature and data search are summarized in Section 3.0.

During the reconnaissance, wetlands, streams and vernal pools were located with a Global Positioning System (GPS) capable of sub-meter accuracy. In addition to locating natural resource features, an existing unmapped trail was GPS located. Additional details of the field reconnaissance are discussed in Subsection 2.2 and the results are described in Section 4.0.

2.0 Study Methodology

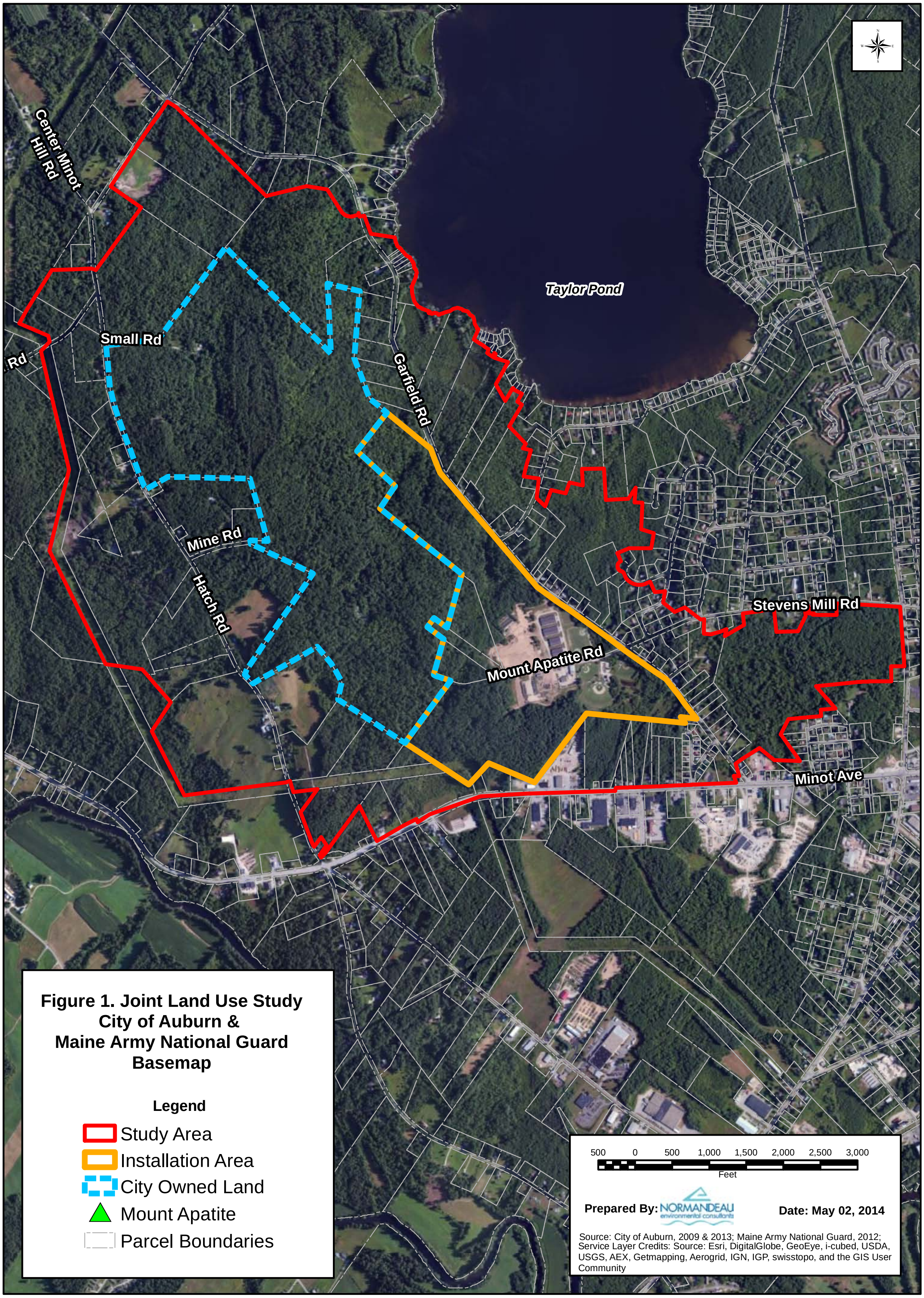
The following subsections describe the methodology, sources of information, and field data collection procedures used for the study.

2.1 Desktop Study

Normandeau reviewed, compiled, processed, and digitized existing natural and cultural resource data for the project parcels and adjacent study area (Figure 1) as the first step in the natural resource study. Data was gathered from numerous sources, in a variety of formats including paper maps, verbal and written descriptions, spreadsheets, Geographic Information Systems (GIS) and Computer Aided Design (CAD). Available data depicts the following resources: wetlands and hydrology; mapped soil series, documented occurrences of rare, threatened, endangered, and species of special concern; land cover; topography; cultural and archaeological resources; as well as information on recreation, aesthetics, transportation, land use and zoning that exist on, and/or adjacent to the project and the largerstudy area.

Information that was utilized in Normandeau's comprehensive review of available data included information from the following sources:

- City of Auburn;
- Maine Army National Guard (MEARNG);
- Maine office of GIS (MEGIS);
- Maine Natural Areas Program (MNAP);
- Beginning with Habitat (BWH);
- Maine Department of Transportation; (MEDOT)
- Maine Department of Inland Fisheries and Wildlife (MDIFW);
- United States Fish and Wildlife Service (USFWS);


Center Minot Hill Rd
Small Rd
Garfield Rd
Taylor Pond
Mine Rd
Hatch Rd
Stevens Mill Rd
Mount Apatite Rd
Minot Ave
Figure 1. Joint Land Use Study
City of Auburn &
Maine Army National Guard
Basemap
Legend
Study Area
Installation Area
City Owned Land
Mount Apatite
Parcel Boundaries
500 0 500 1,000 1,500 2,000 2,500 3,000
Feet
Prepared By: NORMANDEAU environmental consultants
Date: May 02, 2014
Source: City of Auburn, 2009 & 2013; Maine Army National Guard, 2012; Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

- Natural Resources Conservation Service (NRCS);
- National Wetlands Inventory Program (NWI);
- Maine Historic Preservation Commission (MHPC);
- United States Geological Survey (USGS)
- Maine Department of Human Services (MEDHS)
- Maine Drinking Water Program (MDWP)
- National Park Service (NPS)
- United States Army Corps of Engineers (USACE)
- Maine Department of Environmental Protection (MEDEP)
- Maine Emergency Management Agency

Data was compiled and processed, as necessary, for a consistent coordinate system and format. Processing included re-projection, clipping, merging and analysis of the data. Data processing, analysis and map creation was completed using Environmental Systems Research Institute (ESRI) ArcGIS 10.1 software. Information compiled from existing data, online searches, and agency consultation, was overlain on half-foot resolution aerial photography dated May 2010 provided by the Maine Army National Guard, to locate areas with higher ecological and community values, as well as to select locations for field reconnaissance.

2.2 Field Reconnaissance

Five areas of interest within the project area were evaluated by field staff on April 16th and 17th, 2013 (see Figure 3.2 in the JLUS). Field staff located wetland, stream and potential vernal pool features using a Trimble Pro-XRT GPS unit and antenna. Staff documented potential vernal pools harboring the egg masses of wood frogs, spotted salamanders, or blue spotted salamanders. The results of the field investigation are discussed below.

GPS data collected during the course of field work was post-processed using Trimble Pathfinder Office 5.3, to ensure the greatest possible accuracy. Post processing data is important to refine the accuracy and uses fixed beacons on land in known locations to increase accuracy of the satellite derived positions. Post-processed data was then overlaid on aerial photography and used in combination with field notes and sketches to delineate resource boundaries located in the field.

3.0 Desktop Study Results

The following subsections discuss the mapped natural and cultural resources documented within the project area and adjacent study area during the desktop analysis.

3.1 Wetlands

The desktop portion of the wetland analysis involved utilization of NWI data in combination with hydric soils and data from previous field delineations performed within the study area (see Figure 3.4 in the JLUS) these data sources enabled Normandeau to depict real world conditions in order to more accurately assess the conditions in the project area. The intersection of NWI wetlands and mapped hydric soils is typically a better indicator of real world wetlands than NWI alone. Field delineations performed as part of this project are discussed below.

The project area is predominantly upland, with a few scattered NWI mapped forested and scrub shrub wetlands and freshwater ponds totaling a little over 19 acres. These wetlands are relatively evenly distributed throughout the project area with the majority of the larger forested wetlands occurring in the southeastern portion of the project area on the MEARNG property, and scrub shrub wetlands and freshwater ponds in the northwestern portion of the project area. Hydric soils are only mapped in the southern portion of the project area within the MEARNG parcels leading to the assumption that the southeastern portion of the project area has a higher propensity for actual wetlands to occur. Table 1 summarizes wetland types and acreages within the project area.

Table 1. Wetland Types and Acreages within the Project Area

Cowardin Classification	Wetland Type	Acres
PFO1E	Freshwater Forested/Shrub Wetland	2.98
PUBH	Freshwater Pond	0.39
PUBH	Freshwater Pond	0.15
PFO4E	Freshwater Forested/Shrub Wetland	7.03
PSS1E	Freshwater Forested/Shrub Wetland	3.22
PFO1E	Freshwater Forested/Shrub Wetland	0.28
PSS1E	Freshwater Forested/Shrub Wetland	2.15
PSS1E	Freshwater Forested/Shrub Wetland	0.42
PUBH	Freshwater Pond	0.21
PFO1E	Freshwater Forested/Shrub Wetland	1.64
PFO1E	Freshwater Forested/Shrub Wetland	0.43
PUBH	Freshwater Pond	0.45

The study area, which encompasses and additional 842 acres of adjacent land, has mapped NWI forested and scrub shrub wetlands occurring mostly along the eastern boundary, flanking Taylor Pond. There are a few other mapped NWI wetlands in the southern and northwest portions of the study area as well. Mapped hydric soils occur predominantly along the eastern boundary, again, flanking Taylor Pond, and in the southeastern third of the project area. Table 2 summarizes wetland types and acreages within the study area.

3.2 Vernal Pools

There are no previously mapped vernal pools within the project or study area. Five potential vernal pools were documented within the project area during field reconnaissance and are discussed further in Section 4.2.

Table 2. Wetland Types and Acreages within the Study Area

Cowardin Classification	Wetland Type	Acres
L1UBH	Lake	1.10
PFO1C	Freshwater Forested/Shrub Wetland	12.67
PFO1E	Freshwater Forested/Shrub Wetland	52.54
PFO4E	Freshwater Forested/Shrub Wetland	8.41
PSS1E	Freshwater Forested/Shrub Wetland	24.02
PUBF	Freshwater Pond	0.10
PUBH	Freshwater Pond	1.20
PUBHh	Freshwater Pond	0.65
PUBHx	Freshwater Pond	1.63

3.3 Streams and Waterbodies

According to mapped hydrologic resources, there are only a few unnamed ponds and small unnamed streams that occur within the project and study area (see Figure 3.4 in the JLUS). In the southeast corner of the study area there are two unnamed streams which join together just outside of the study area and run east toward an unnamed pond. There is a small unnamed pond close to the western boundary of the study area, and several quarries which are centrally located in the project area. The quarries are remnants of a commercial feldspar mining operation from the early 1900's.

More notable hydrologic features exist adjacent to the study area. The northern boundary of the study area abuts Taylor Pond, which is a quite heavily developed freshwater pond with no public access point. Taylor Pond is considered high value brook trout habitat, and also provides habit for some species of inland wading birds and waterfowl, discussed further in Sections 3.5 and 3.6. The Little Androscoggin River is located south-south west of the study area. The Little Androscoggin River flows easterly to its confluence with the Androscoggin River in Auburn.

3.4 Topography

The majority of the project area can be characterized as somewhat rugged terrain in the northern three quarters, and much flatter terrain in the southern portion of the project area where the MEARNG facility is located (see Figure 3.5 in the JLUS). Elevations in the study area range from 219 feet at the lowest point in the southwestern corner, to 523 feet at the highest point approximately 1600 feet north-northwest of Mt. Apatite peak.

A Digital Elevation Model (DEM) from the National Elevation dataset (USGS) was used to calculate slopes for the project area. A 1/3 Arc Second DEM was downloaded and re-projected to State Plane, Maine West Zone, NAD 83 US Survey Feet to match other project data. The Slope tool in the Spatial Analyst extension for ArcGIS was run to determine the degree of slope. Slopes were classified to illustrate areas where steep slopes may cause issues for development (see Figure 3.6 in the JLUS). Slopes range from 0 to 15 percent in the majority of the study area, with slopes >15 percent running along ridgelines.

3.5 Terrestrial Wildlife

Numerous data sets were reviewed for the presence of fauna and associated habitats. Mapped terrestrial wildlife and habitat in the study area includes undeveloped habitat blocks and potential wildlife habitat connectors (see Figure 3.7 in the JLUS).

Undeveloped Habitat blocks represent large, contiguous forested areas in Maine that are at least 500 feet away from development and improved roads. These habitat blocks were developed to highlight forested areas in Maine where development has not yet occurred. Extensive blocks of undeveloped habitat are important for wildlife species that require large areas or are sensitive to human disturbance. Approximately 64% or the project area (325 acres) and 52% of the study area are mapped as undeveloped habitat blocks.

Potential Wildlife Habitat connectors contain MDOT Roads that intersect potential connections between adjacent undeveloped blocks (of at least 100Ac.) as mapped by the “Beginning with Habitat”(BwH) program. This data set illustrates the most important connections between high-value wildlife habitats and undeveloped habitat blocks. There are approximately 627 linear feet of mapped habitat connectors in the project area, and 3486 linear feet within the study area.

3.6 Other Wildlife

Other wildlife and associated habitats within the study area include inland waterfowl and wading bird habitat, high value brook trout habitat, and potential riparian connectors (see Figure 3.7 in the JLUS).

Inland waterfowl and wading bird habitat represents a Significant Wildlife Habitat defined under Maine's Natural Resources Protection Act (NRPA). Inland waterfowl and wading bird habitats are protected under the NRPA and shoreland zoning. Only polygons with a high or moderate rating qualify under NRPA, and only polygons that qualify under NRPA and have a wetland size of at least 10 acres qualify under shoreland zoning. There are approximately 14 acres of inland waterfowl and wading bird habitat in the project area, located in the most southern portion on the MEARNG property. There are 67 acres of Inland waterfowl and wading bird habitat in the study area. In addition to the area at the southern end of the project area, there is a large area (46 acres) of habitat along the eastern boundary of the study area adjacent to Taylor Pond. Inland waterfowl and wading bird habitat within the project and study area is moderate and qualifies for protection under Maine's Natural Resources Protection Act.

Taylor pond is mapped as high value brook trout habitat adjacent to the study area but nothing is mapped within the project or study area.

There are 2638 feet of mapped riparian corridors in the study area, of which, the majority is located along Garfield Road, adjacent to the study area. Riparian corridors **are** potential hotspots of riparian species crossing and/or barriers on MDOT Roads - based on BwH connectivity focal species models as contained in BwH Connectivity_Background_Data.gdb, and BwH modified landcover data (bwh_lcd). These data are for planning purposes only and should be field verified. They represent the best, modeled approximation of stretches of roads with high probability to serve as barriers to riparian species movement. On the ground conditions may vary from the conditions as they are represented in the many individual datasets on which these data are based.

3.7 Rare Habitats

One threatened species has been documented within the project area during previous field surveys (see Figure 3.7 in the JLUS). The Small whorled pagonia (*Isotria medeoloides*), which is a member of the orchid family, grows in older hardwood stands of beech, birch, maple, oak, and hickory that have an open understory. Sometimes it grows in stands of softwoods such as hemlock. It prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams. The Small whorled pogonia was added to the U.S. List of Endangered and Threatened Wildlife and Plants in 1982 as an endangered species. In 1994, it was reclassified to threatened.

3.8 Cultural Resources

The National Register of Historic Places is the Nation's official list of cultural resources worthy of preservation. The Maine Historic Preservation Commission (MHPC), a state governmental agency, has been designated as the State Historic Preservation Office, and it oversees the administration of the National Register program in the State of Maine. Based on review of materials provided by the MHPC(see Figure 3-8 in the JLUS), there is a historic structure at 171 Hatch Road that is potentially eligible for the national register. There is also a historic archaeological site at the location of the old military rifle range on the MEARNG property. There are no prehistoric archaeological resources within the project or study area.

3.9 Constraints Analysis

In order to determine the best possible areas for development, a constraints analysis was performed using GIS. The type of GIS model chosen is a powerful, yet simple spatial model that divides the project area into small pixels of area and then ranks each individual pixel of land based on how many constraints fall into that pixel. In other words, a GIS model takes layers of spatial information derived from inputs to the model and overlays them using a weighting, in this case a score for how much of a limitation to development is posed in a particular area, and other processes to compute an overall score for each part of project area (Illustration 1). A more detailed introduction to GIS-modeling and a description of the methodology and model inputs are included in Section 3.8.1, below. Normandeau utilized state-of-the-art software including Environmental Systems Research Institute (ESRI) ArcMap 10.1 and the Spatial Analyst extension to complete the mapping.

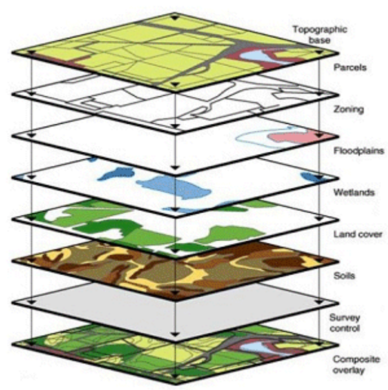


Illustration I
General schematic of how a GIS utilizes layers of spatial data

3.9.1 Introduction to GIS Modeling

Spatial models are commonly used to evaluate and/or predict large-scale biological or environmental patterns in the landscape. Spatial modeling is a set of procedures that simulates real-world conditions within a GIS using the spatial relationships of geographic features. Modeling requires that complex processes and systems in the real world be reduced to finite and manageable quantities by processes of generalization and/or extraction.

ModelBuilder is an application within ArcMap that is used to create, edit, and manage spatial models. Models are workflows that string together sequences of geoprocessing tools, feeding the output of one tool into another tool as input1 (Illustration 2).

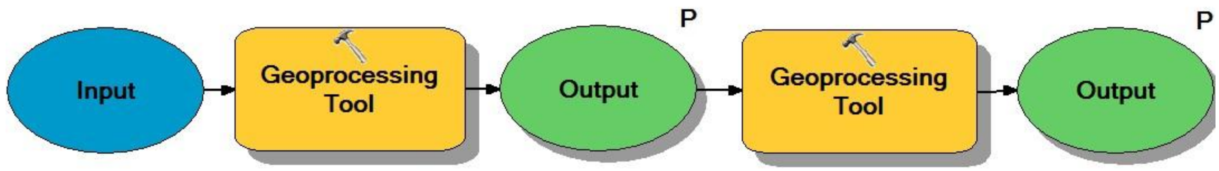


Illustration 2
ModelBuilder Workflow.
(Blue Oval = Input, Yellow Square = Tool, Green Oval = Output)

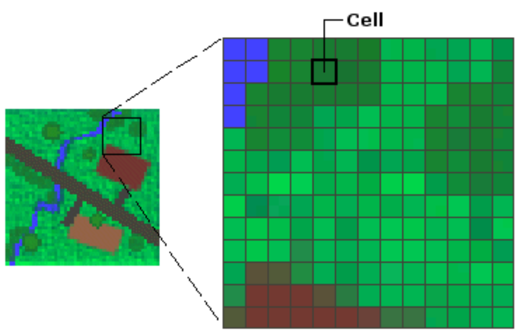


Illustration 3
Raster Data Format

When creating a spatial model a variety of data sources may be utilized including vector data, raster data, Triangulated Irregular Network (TIN) data or any combination of the above. Normandeau utilized mainly the raster data model in the preparation of the constraints model to take advantage of the powerful processing capabilities. Some data sources were input in a vector format but were converted to raster format for inclusion in the model.

A raster is a grid of equally sized cells (pixels) where each cell contains a value that represents information such as vegetation type (thematic data), or elevation (continuous data) (Illustration 4). Even though the structure of raster data is very simple, it is very useful for a wide range of applications including advanced spatial analysis, representation of continuous surfaces and surface analysis, and the ability to perform fast overlays with complex data sets. Raster data is core to GIS: it exists as digital aerial photographs or satellite imagery from any type of sensor, such as multispectral or thermal and it can include elevation models or scanned maps, and thematic raster data such as a land classification or the grid-based output from an analysis or interpolation process.

The formal logic of rasters is known as “Map Algebra.” Map Algebra is the analysis language for ArcGIS Spatial Analyst. Map Algebra is a language that defines syntax for combining map themes by applying mathematical operations and analytical functions to create new map themes. Within the ArcGIS (ModelBuilder) interface, Map Algebra is performed using the Raster Calculator (see Illustration 4). The raster calculator is used to execute a single map algebra expression in a calculator-like interface. The raster calculator is the tool that was used to combine all model inputs into the final constraints analysis output raster. Additional tools utilized within the model will be discussed below.

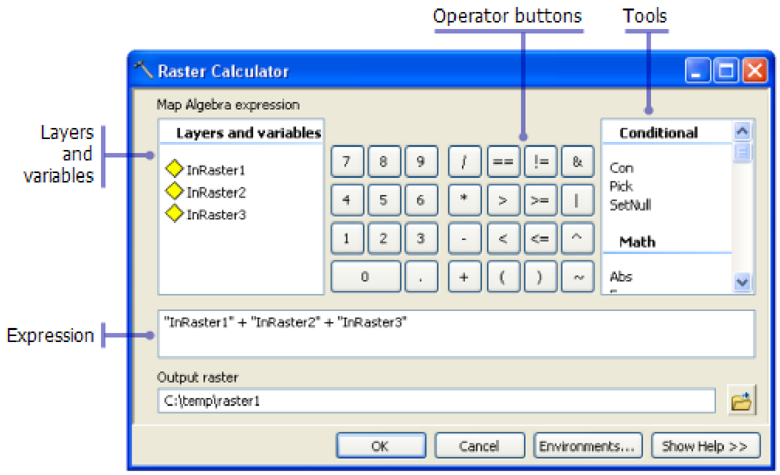


Illustration 4
Raster Calculator Interface

3.9.2 Data Acquisition

Data was acquired from a variety of sources in numerous formats. Appendix A contains a list of data sources and raw data collected, regardless of whether it was ultimately utilized in the model. Certain data required processing, such as re-projection of the coordinate system, extraction, and format conversion prior to inclusion in the model.

3.9.3 Pre-Model Processing

In order for the model to run correctly and the outputs to be accurate, input data needed to be in the same projection. The projection selected for model data was State Plane, Maine West Zone, NAD 83 Datum, and units in Feet. All data not acquired in that coordinate system was re-projected to put all data into the same projection prior to building and running the model. Some of the datasets, such as soils, had extraneous information that was not necessary to the model, so the relevant portions were extracted from the whole data set. The majority of the datasets also needed to be converted from vector to raster format prior to inclusion in the model.

3.9.4 Model Structure and Inputs

Once the pre-processing discussed above was finished, inputs were ready to be incorporated into the model. A list of each input and the weighted value is below, in Table 3.

The structure of the model is relatively simple (see Figure 3.10 in the JLUS). Model inputs were scored base on each criterion's perceived limitation to. In this model, scoring is the process of changing the values in the raster, i.e. all NWI areas were scored as a value of 3. See Table 3 for a list of all the scores for the various model inputs utilized.

Table 3. Auburn Constraints Analysis Inputs

Elements	High Limitation - 3	Medium Limitation - 2	Low Limitation - 1
Farmland soils		Prime soils, soils of statewide significance, areas within 50 ft of farmland soils	
Hydric Soils	All Hydric soils and the area within 50 ft of Hydric	Within 50+ - 75 ft of hydric soils	Within 75+ - 100 ft of hydric soils
Wetlands - salt marsh, shrubby swamp, forested swamp	All wetlands and the area within 50 ft of wetlands	Within 50+ - 75 ft of wetlands	Within 75+ - 100 ft of wetlands
Surface water	Surface water and areas within 75 ft of surface water	Within 75+ - 150 ft of surface water	Within 150+ - 250 ft of surface water
Shoreland zoning	Areas within 250 ft of great ponds; areas within 75 ft of streams		
Endangered animals/plants		All	
Key habitat (Inland Wading Waterfowl Habitat, High Value Brook Trout Habitat)		All	within 75 ft
Archaeological Resources (Historic and Prehistoric)		Known Site - historic and prehistoric	Check for archaeological resources
Potential Habitat Connectors and Potential Riparian Connectors		All	
Undeveloped Blocks			All
Slopes	>25%		>15 - 25%
Buildings		On site and immediately adjacent	
Ballfields			All
All Clear Area	x2		
2013 Delineated Wetlands	all		
2013 Delineated Streams	all		
2013 Delineated Vernal Pools	all		
Noise Contours	Level III	Level II	

3 - impact on health/safety and/or highly regulated by federal/state government or issue of very high value to community;

2 - issue of value to community;

1 - issue of value to community and impacts likely can be mitigated through good design

Scores and reclassified data were then added together using the raster calculator. These processes overlay each of the input raster datasets then adds the values (scores) for input dataset for each pixel resulting in a final "score" for each individual pixel (Illustration 5).

The additive raster score resulting from the model represents the relative likelihood of a pixel having constraints for development. The values are relative values, not absolute, and should be looked at as a range of probabilities as to the likely presence or absence of constraints.

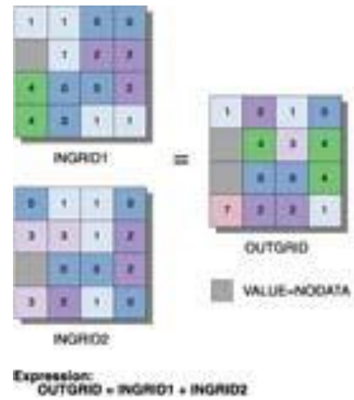


Illustration 5
Adding Rasters in the Raster Calculator

3.9.5 Results and Discussion

Figure 3-10 in the JLUS shows the analysis output from the constraints model for the project area, with the model scores color coded based on the results of the classification. Blue pixels represent the areas that have the least amount of constraints to development, with red areas having the most constraints. Areas in the color range between resulted in a score that was somewhere in the middle of the spectrum. 19 were the maximum pixel score and X was the minimum pixel score, with an average value of 3.48.

4.0 Field Reconnaissance Results

Five areas of interest within the project area were evaluated by field staff on April 16th and 17th, 2013 (see Figure 3.2 in the JLUS). The following sections discuss the results of the field reconnaissance. Discussion includes wetlands, streams, and vernal pools identified in surveyed areas.

4.1 Wetlands and Streams

The field crew located five wetlands on the new survey parcels and one additional wetland (W6) in the previously delineated area (see Figure 3.3 in the JLUS). The majority of the cover types present within the wetlands are palustrine forested wetlands with either an evergreen or a mixture of evergreen and broad-leaved deciduous trees in the overstory. Palustrine scrub-shrub covertypes were also represented as components of several wetlands. The wetlands identified and mapped during a previous delineation effort were reviewed in the field with the use of electronic data and flags that remained visible. These resources appeared satisfactory and were not altered.

Wetlands W1 and W2 are small wetlands adjacent to the main parking lot for the recreation area. These wetlands are bordered on all sides by development, including a paved road, gravel lot, and maintained turf adjacent to the baseball diamonds. W1 is classified as a palustrine forested, broad-leaved deciduous, seasonally flooded wetland (PFO1C). The dominant overstory species is Red maple (*Acer rubrum*) with a lower density of Green ash (*Fraxinus pennsylvanica*). Highbush blueberry (*Vaccinium corymbosum*) and Speckled alder

(*Alnus incana* ssp. *rugosa*) dominate the understory throughout the interior of the wetland. A large vernal pool was identified throughout the northwest portion of the wetland. Wetland W2 receives flow through a culvert under an unpaved access road.W2 is classified as a palustrine scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated wetland (PSS1E). Dominant species include Maleberry (*Lyonia ligustrina*) and Highbush blueberry (*Vaccinium corymbosum*). Westernmost portions of both of these wetlands are routinely mowed by groundskeeping personnel.

Wetland W3 is a very large complex of wetland and deepwater systems that occupies the majority of the easternmost portion of the survey area. It receives flow via the culvert from W2. Approximately 20% of the site is open water classified as palustrine unconsolidated bottom (PUB) habitat surrounded palustrine emergent wetland (PEM) communities dominated by Tussock sedge (*Carex stricta*), Broad-leaved cattail (*Typha latifolia*), and Reed canary grass (*Phalaris arundinacea*). The remainder of the site is a palustrine forested wetland dominated by a mixture of needle-leaved evergreen and broad-leaved deciduous overstory species (PFO1/4). Dominant species include Red maple (*Acer rubrum*), Pitch pine (*Pinus rigida*), White pine (*Pinus strobus*), Green ash (*Fraxinus pennsylvanica*), and Gray birch (*Betula populifolia*). Smaller areas of palustrine scrub-shrub communities typified by a mixture of broad-leaved deciduous and broad-leaved evergreen species (PSS1/3) are found in association with the forested wetland communities. Dominant shrub species included Highbush blueberry (*Vaccinium corymbosum*), Leatherleaf (*Chamaedaphne calyculata*), Rhodora (*Rhododendron canadense*), and Sheep laurel (*Kalmia angustifolia*). Hydrology throughout these wetland types range from mesic woodlands to inundated depressions supporting the formation of suitable vernal pool habitat. This wetland has been impacted by Garfield Rd. and the installation of the baseball diamonds on the west side. Construction of the baseball diamonds required filling margins of the wetland associated with the deeper areas of open water. Additionally, a snowmobile trail is located along the south and east perimeter of the wetland. The majority of this trail is located in uplands, although it crosses the wetland on the west side, immediately south of the largest baseball diamond.

Wetlands W4, W5, and W6 are palustrine forested wetlands associated with streams. Wetland W4 is a small forested riparian fringe wetland (PFO1E) associated with intermittent stream S1 in the northernmost survey site adjacent to the parking area for the Mt. Apatite Recreation Area. It is dominated by Red maple (*Acer rubrum*) in the overstory and Speckled alder (*Alnus incana* ssp. *rugosa*) in the understory. W5 is upslope from this and is a larger deciduous forested wetland complex (PFO1E) that surrounds stream S1. The stream braids through the wetland, subsequently becoming channelized and flowing down a steep grade. Dominant species include Red maple (*Acer rubrum*), Ash-leaved maple (*Acer negundo* var. *negundo*), and Eastern hemlock (*Tsuga canadensis*). A well is located in this wetland, possibly providing water to the Auburn Parks and Recreation Department facility located downslope. Wetland W6 is located in the previously surveyed portion of the site at the south corner. This is a small seep that flows into an ephemeral stream. The seep is classified as a coniferous forested wetland (PFO4E) dominated by Eastern hemlock (*Tsuga canadensis*) and Green ash (*Fraxinus pennsylvanica*). Please see Appendix Wetland Field Sheet, Appendix Wetland Determination Form, and Appendix Stream Data Sheet for more information on the wetlands and streams assessed.

4.2 Vernal Pools

Three vernal pools were identified (VP-1, VP-2 and VP-3) during the field reconnaissance (see Figure 3.3 in the JLUS). Please see Appendix Maine State Vernal Pool Assessment Forms for more information on located vernal pools.

For a pool to be protected by the State of Maine as a significant wildlife habitat it must be semi-permanent with no permanent inlet or outlet or predatory fish. Man-made pools (but not man-modified) that meet the physical characteristics do not qualify as a significant vernal pools. In addition to the physical characteristics a significant vernal pool must meet an abundance of egg masses criteria consisting of 10 or more blue-spotted salamander egg masses, 40 or more wood frog egg masses, 20 or more spotted salamander egg masses or presence of fairy shrimp, at a minimum. The only pool meeting the physical and abundance criteria is VP1. Regardless of state status (i.e., significant or not significant), all of the pools identified represent biological resources and serve as critical features to the wildlife food web of the entire area.