Mapping the Intersection of Agricultural Development and Riparian Buffer Zones along the Androscoggin River

Objective

The Manomet Center for Conservation Sciences is working on a program to improve riparian buffer zones along riverbanks in Maine, especially in agricultural areas. When farmers farm right up to the water’s edge, there is a greater risk for erosion and agricultural run-off that can damage the watershed as a whole, and the various ecological services and economic activities associated.

This project examines a segment of the Androscoggin River at Rumford Point (HUC 10400020207) watersheds in Maine. Looking at a 100ft buffer zone along each side of the river, it establishes the types of land cover on the banks. With this analysis, tax parcels were intersected with areas of high potential for renewal of their riparian buffer zone. The Tax IDs available within the parcel datasets allow for the identification and contact of landowners in order to encourage the practice of maintaining healthy riparian buffer zones.

What’s a Riparian Buffer Zone?

The riparian buffer zone is the ecological niche habitat along the banks of rivers. It’s a “three-dimensional zone of interaction between terrestrial and aquatic ecosystems,” which implies that it takes into account “that riparian buffer zones extend down into the ground water, up into the canopy, out across the floodplain, and into the slopes that drain to the water course.”

In the context of agriculture, riparian zones provide a number of environmental services. They act as habitat for local fauna, helping to preserve diversity and lend refuge to potentially beneficial species, such as pollinating insects and birds. Riparian buffer zones also importantly protect the health the river they abut by minimizing runoff of soil sediment and agricultural chemicals.

There is little scientific consensus on the minimal width of an effective riparian buffer, with studies indicating effective widths ranging from 35ft to 400ft. Thus, it is important to recognize that “no two riparian buffer zones are alike with respect to their characteristics or function.” For our analysis, 100 ft was chosen as an intermediate value that could also realistically be incorporated into an agricultural parcel.

Methodology

1) Establish Land Cover use

After establishing a 100ft buffer along the segment of river, the Maine Land Cover Dataset (MELCD), a detailed resolution of Maine’s surface land cover, was clipped to that area. After, the values of each type of land cover were identified, and their acreage calculated.

2) Consolidate Land Cover Values

In order to make analysis easier, and more visually appealing, the land cover types were divided into three categories: those with High Potential for riparian zone renewal, those with Medium Potential, and those with Low Potential, meaning they either don’t need to be addressed or are not able to be addressed (developed spaces.) High Potential types (Cultivated Land, Pasture/Hay, Grassland/Herbaceous, and Blueberry Fields) were coded with a value of 2 and projected in red; Medium Potential coded as 1 and projected in yellow; and Low Potential coded as 0 and projected in blue.

3) Identify High Potential Parcels

Using various selection tools, the parcels that intersected with areas of the riparian buffer with High Potential were identified and selected out of all parcels. From the attribute tables of these parcels, tax ID information was identified and then used to search local assessors’ data for the names and addresses of the various landowners.

Analysis Challenges

The primary challenges that existed in this project were a result of Maine data accessibility and ArcGis glitches.

The first is that the town parcel data for Maine is incomplete. Although most of the state is expected to come online by the beginning of 2012, many towns have not yet digitized their maps. For this reason, there are no parcels along the north shore of the river segment under analysis, despite the presence of High Potential areas. Furthermore, the local assessors’ offices catalog data differently, so the parcels that fell into the town boundary of Rumford do not have reference numbers that align with the information available in the parcel data sets.

The second challenge was ArcGIS, which was prone to crash when the large land cover data sets were imported. The only fix was to keep trying until they worked; there was usually greater success is the data frame was zoomed in close when the data layer was added.

By Alex Freedman—UEP 232, Fall 2011

Projection: NAD 1983 UTM Zone 19N

Sources:

MEGIS, USGS National Map

---

**MELCD Categories**

<table>
<thead>
<tr>
<th>Category</th>
<th>ACRES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed, medium intensity (3)</td>
<td>46.588</td>
</tr>
<tr>
<td>Developed, high intensity (2)</td>
<td>3.632</td>
</tr>
<tr>
<td>Developed, low intensity (4)</td>
<td>75.619</td>
</tr>
<tr>
<td>Developed, open space (5)</td>
<td>4.277</td>
</tr>
<tr>
<td>Unconsolidated shore (1)</td>
<td>10.770</td>
</tr>
<tr>
<td>Grassland/Herbaceous (8)</td>
<td>2.970</td>
</tr>
<tr>
<td>Forest regeneration (26)</td>
<td>0.110</td>
</tr>
<tr>
<td>Mixed forest (11)</td>
<td>1.808</td>
</tr>
<tr>
<td>Palustrine scrub/shrub (12)</td>
<td>0.127</td>
</tr>
<tr>
<td>Scrub/shrub (12)</td>
<td>0.806</td>
</tr>
<tr>
<td>Shoreline (16)</td>
<td>6.108</td>
</tr>
<tr>
<td>Unconsolidated (19)</td>
<td>3.632</td>
</tr>
<tr>
<td>Emergent (15)</td>
<td>0.107</td>
</tr>
<tr>
<td>Emergent, palustrine (22)</td>
<td>7.312</td>
</tr>
</tbody>
</table>

**Riparian Buffer Zones along the Androscoggin River**

By Alex Freedman—UEP 232, Fall 2011

Projection: NAD 1983 UTM Zone 19N

Sources:

MEGIS, USGS National Map

---

**Analysis Challenges**

The primary challenges that existed in this project were a result of Maine data accessibility and ArcGis glitches.

The first is that the town parcel data for Maine is incomplete. Although most of the state is expected to come online by the beginning of 2012, many towns have not yet digitized their maps. For this reason, there are no parcels along the north shore of the river segment under analysis, despite the presence of High Potential areas. Furthermore, the local assessors’ offices catalog data differently, so the parcels that fell into the town boundary of Rumford do not have reference numbers that align with the information available in the parcel data sets.

The second challenge was ArcGIS, which was prone to crash when the large land cover data sets were imported. The only fix was to keep trying until they worked; there was usually greater success in the data frame was zoomed in close when the data layer was added.

By Alex Freedman—UEP 232, Fall 2011

Projection: NAD 1983 UTM Zone 19N

Sources:

MEGIS, USGS National Map