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<!DOCTYPE html>
<html>
<head>
<title>WaterBalance</title>
<link rel="stylesheet" type="text/css" href="./_css/style.css" /> <!--
Refers this page to a css formatting page which provides the
background detail of the page -->
<meta content="en-ca" http-equiv="Content-Language" />
<meta content="text/html; charset=utf-8" http-equiv="Content-Type" />
</head>

<script src="http://maps.googleapis.com/maps/api/js"></script>
<script src="./_javascripts/googleAPI.js"></script>

<div id="nav-wrap">
  <div id="topnav">
    <div id="page">
      <ul class="dropdown">
        <li><a href="index.html">Home</a> </li>
        <li><a href="about.html">About</a></li>
        <li><a href="experience.html">Experience</a>

          <ul class="dropdown-menu">
            <li><a
href="WaterBalance.html">NC Thesis Project</a></li>
            <li><a
href="experience.html#Work">Work Experience</a></li>
            <li><a href="#">Education
Experience</a></li>

          </ul>
        </li>
        <li><a href="contact.html">Contact</a></li>
      </ul>

      <div style="clear:both"></div>
    </div>
  </div>
</div>
<div id="header-wrap">
  <div id="page">

    <table id="header">
      <tr>
        <td id="logo"><a class="logo"
href="Home.html"> Joshua Valenti</a></td>
        <td id="header-right">
          <a href="http://
ca.linkedin.com/in/joshvalenti"></a>

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                <a
href="mailto:josh8valenti@hotmail.com"></a>
                </td>
            <tr>
                <td> B.Sc., GIS:GM (P.G)</td>
            </tr>
        </table>
    </div>
</div>
<div id="banner-wrap" class="wsite-background">
    <div id="page">
        <div id="banner">
            <div id="banner-inner">
            </div>
        </div>
    </div>
</div>
<div id="main-wrap">
    <div id="page">
        <div id="content"; background-image: src ="/
images/Main_Bg.jpg">
            <h1>Water Balance in the Holland Marsh
[2004-2014]</h1> <br>
            <p>This project was completed by Josh Valenti
and Ryan Roque for our GIS: Geospatial Management Thesis Project
during our time at Niagara College. This project was completed for
the Drainage Investment Group (DIG),
            under the supervision of Mr. Ian Smith. The
purpose of this project was to compute a water balance of the Holland
Marsh from 2004-2014 within a GIS environment.</p>
            <br><h2>Introduction</h2><br>
            <p>The Marsh was drained in the early 1920's
strictly for agricultural use. This process consisted of the building
of the canal that travels along the north and the south borders of the
marsh,
            allowing for the Holland River to flow
through the heart, draining north into Cook's Bay of Lake Simcoe.
Over the last decade, the Holland Marsh has experienced drainage
issues, causing valuable land to flood and as a result,
            destroying crops. Along with flooding, soil
erosion has become a primary concern, as the water flow has become a
key factor in depleting the land available for agricultural production
(Planscape Inc. , 2009).
            </p>

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<p>To mitigate against events destructive to the land, a water balance was calculated for the previous decade (2004 to 2014) using geographic information systems (GIS). A water balance is an analysis over an area comparing the amount of incoming (precipitation) and outgoing (evapotranspiration) water flow of a system. A surplus of water has been occurring recently within the marsh, causing fields to be completely submerged under water.

A surplus occurs when the amount of incoming water (precipitation, inflows from surface and groundwater) exceeds that of the storage capacity and the output of a system.</p>

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<p> <h2> Study Area</h2><br>
<div id = "gMap"></div>
<div id = "Mapbtn">
  <input type="button" id="addPnt1" title="add
pnt" value="Holland Marsh" onclick="addPnt()" />
  <input type="button" id="addRiver"
title="addLine" value="Holland River" onclick="addHollandRiver()" />
  <input type="button" id="addPoly" title="add
poly" value="Holland Marsh Boundary" onclick="addPoly()" />
  <input type="button" id="addLine" title="add
line2" value="Bike Route" onclick="addLine()" />
  <input type="button" id="addPnt" title="add
pnt" value="Niagara College" onclick="addNC()" />
  <input type="button" id="clear" title="Reset"
value="Reset" onclick="initialize()" />
</div>
```

<p>The location of the study area is the very fertile Holland Marsh. Located in Bradford, Ontario, the Holland Marsh is located 50 kilometers north of Toronto. The ability to grow and harvest one billion dollars in product each year, is a result of the incredibly fertile muck soil.

</p>

<h2>Project Goal</h2><br>

<p>The project goal is to derive and calculate the water balance of the Holland Marsh to allow for the identification of areas that are potentially susceptible to high nutrient intake. This will be done by initiating an analysis of meteorological data in the Holland Marsh area.

By investigating past climatic trends such as temperature, precipitation, solar radiation and major storm events, the water balance will be calculated on a seasonal basis to highlight areas vulnerable to nutrient loading.

</p>

<p>A water balance is the amount of water entering a system compared to that of the water that is leaving the system within time (t).

<br>

## <h2>Temperature</h2>

<p>Temperatures separated by seasons; Growing Season (July–October), Winter (December–February), Fall (September–November), Summer (June–August),

and Spring (March–May) over the past decade.

The winter and spring temperatures have a gradual increasing trend, while the summer and fall months have been gradually decreasing temperatures.

Thus resulting in a longer, more moderate growing season.

## <h2>Precipitation</h2>

<p>The daily precipitation events were recorded for the past decade, alongside the 10, 25 and 50 year return events. Significant extremes were shown for August 19, 2005 and July 27, 2014. The precipitation event during August of 2005, was the second largest recorded event since 1954’s Hurricane Hazel (Toronto Sun, 2009).

Both of these extreme events produced mass flooding for the Holland Marsh, and most of Southern Ontario. </p>

</div>

</div>

</div>

</div>

<div id="footer-wrap">

<div id="page">

<div id="footer">Josh Valenti<br>24 Wellwood St.<br>Hamilton, Ontario, Canada</div>

</div>

</div>

</body>

</html>