Real Vegetation – Laboratory and Field Studies

James Hart

Aims of Laboratory Test Programme

As with artificial vegetation, quantify the flow-field and mixing characteristics within and at the interface of:

- Three types of Vegetation (one species of emergent, submerged and floating)
- Test each species at least 4 times though the seasonal growth cycle

Laboratory Facilities

Wide Flume

Deep Flume

Laboratory Test Series Plan

<table>
<thead>
<tr>
<th>Season</th>
<th>Month</th>
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<tbody>
<tr>
<td>Spring</td>
<td>April - June</td>
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<td>Summer</td>
<td>July - September</td>
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<td>Autumn</td>
<td>October - December</td>
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<td>Winter</td>
<td>January - March</td>
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<thead>
<tr>
<th>Type</th>
<th>Species</th>
<th>Flume</th>
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<tr>
<td>Emergent</td>
<td>Typha</td>
<td>Wide</td>
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<tr>
<td>Submerged</td>
<td>Carica</td>
<td>Deep</td>
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<tr>
<td>Floating</td>
<td>Lillies</td>
<td>Deep</td>
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Real Vegetation Supply

Emergent – Typha
Submerged – Carex
Floating – Lilies

Supplied By Salix:

From ponds on Campus:

Real Vegetation Installation

Real Vegetation Quantification

Method 1: Stem count
Method 2: Volume displacement
Method 3: Image processing for frontal area of representative slices

Aims of Field Work

For at least two sites obtain:

- Residence time distribution
- Discharge

For a range of discharges per season for the 4 seasons of the growth cycle
Challenges of Field Work

- Locate at least 2 sites
- Obtain permission from site owners
- Survey sites
  - Topography
  - Vegetation
- Set-up automatic dye injection/detection system for storm events

Requirements for Site

1. A pond with a permanent pool and a variety of vegetation. (30-60% coverage)
2. Online pond with a permanent flow
3. A nominal retention time (volume/discharge) of 1-2 days
4. Local to University of Warwick – ideally within a 1 hr drive
5. Easy access and local support
6. Possibility of generating synthetic discharges. This would require either access to a local water course that can be pumped from, so risks associated with hydraulic and/or water quality impacts need to be considered.
7. Possibility of undertaking management activities: remove vegetation?
8. Ideally limited use by birds and definitely not a SSSI, wildlife sanctuary or duck farm!

Possible sites – Site 1

Off A429 just south of M40 Jn15, near Warwick and Leamington Spa

- Online
- Appropriate size
- Vegetated with interesting vegetation distribution
- Very local to Warwick Uni (20 mins)
- Easy access

Possible sites – Site 2

Between Jn. 10 and 11 of M40, just south of Banbury near village of Souldern

- Online
- Appropriate size
- Vegetated with interesting vegetation distribution (possible short-circuiting)
- Local to Warwick Uni. (45 mins.)
Next 18 Months...

<table>
<thead>
<tr>
<th>Task list</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
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