

Notes from the Thursday April 20 2006 Meeting of the Scientific Advisory Panel

Burns Bog Ecological Conservancy Area

Attendance

SAP members: Richard Hebda, Allan Dakin (by phone), John Jeglum and Bob Peart

Absent: Geoff Scudder, Hamish Kimmins, Bert Brink

Planning Team Members: Greg Paris, Verne Kucy, Tom Bell

Guests: Sarah Howie, Paul Whitfield

1. Notes from the March 16, 2006 meeting were accepted.
2. The agenda was approved as distributed.
3. Discussion of the Burns Bog Perimeter and Lagg
 - a. Desired Lagg Attributes

Appendix One describing the desired attributes of the lagg was distributed. It was reviewed and Bob was requested to quantify the attributes as much as possible by reviewing the Ecosystem Review and plugging in known data --- for example the pH range. The following general comments were made:

 - Fundamentally we need to control the water table level of the Bog.
 - Any data collected needs to be related to the true elevations so it is meaningful. The work in progress by Delta will provide this context. Then various ditches will be blocked and controlled accordingly. If controlled properly the water table level shouldn't fluctuate dramatically.
 - The water depth of the lagg/ditches is generally too low now in relation to the adjacent landscape. The association between lagg water depth and the adjacent landscape is critical.
 - The priority is to stop the water from flowing out of the Bog through ditches. The long term goal is to block the ditches so that the natural flow of the water is through the peat/acrotelm --- as either a natural or artificial lagg; thus minimizing the rate of water flow from the Bog.
 - Large expanses of open water in the Bog aren't natural --- we need smaller ponds and hummocks with an ever-increasing mat of *Sphagnum*.
 - b. 'Walk Around the Bog'

Refer to the attached map, with thanks to Sarah. Using an admittedly rough scale of 1 to 10 the perimeter of the Bog was discussed and 'measured' accordingly to personal knowledge of the lagg and the bog. There was some discomfort with this approach; however it clearly gave a sense of where the lagg might be artificially needed and where it is more natural in relation to the perimeter. The 1 to 10 scale was based on the existence of natural lagg functions. See table below.

Measure	Natural to Non-existent	Lagg Functions
10	Natural Lagg	The three lagg functions of hydrology, hydrochemical and ecological are fully integrated.
9 8 7		Two of the three functions of hydrology, hydrochemical and ecological are integrated. The third may exist but is not integrated.
6 5 4		Only two of the functions of hydrology, hydrochemical and ecological exist. They may not be integrated.
3 2 1		Only one of the key functions exists. There is no integrated function.
0	Non-existent	

- This ‘walk around’ map will be discussed at the next meeting and perimeter priorities based on the previously agreed to three step process:
 1. Define where the natural lagg currently exists,
 2. Determine where it can be restored, and
 3. If neither of these options is realistic, then determine how an artificial lagg can be developed. Develop the lagg-ditch ratio.
- According to this analysis the most natural remaining lagg seems to be the Crescent Slough/Sherwood Forest, the NE corner on private land, some aspects of the Delta Nature Reserve, along the south east corner and the ‘L’ shaped piece along the east/south perimeter of the landfill.
- It was briefly discussed that to artificially achieve a ‘7 or 8’ lagg, we will need to cut down trees and/or plant willow and alder species along the perimeter.

4. Draft Research and Monitoring Strategic Outline

Bob circulated a draft research and monitoring outline. It was discussed and modified – refer to Appendix Two. This strategic outline will be discussed at the May meeting with the goal of finalizing it at the June SAP meeting.

- The agencies (particularly Delta and GVRD) requested direction regarding funding as they need to have a sense of how much this research and monitoring strategy will cost so they can incorporate figures into their budgeting processes. It was agreed that Hebda, Dakin, Jeglum and Peart would meet prior to the May meeting to do a rough budget estimate for discussion at the May SAP meeting.

5. Next Meeting

The next meeting will be at the usual time and place --- Thursday May 18. The agenda will focus on

- Wildfire Strategy Update and Discussion
- Review of draft Research and Monitoring Strategy
 - Budget Discussion
- Review of Lagg ‘Walk Around’ map and desired lagg attributes, followed by a discussion of priorities
- Brief Gateway Program Update

APPENDIX ONE

Desired Lagg Attributes

April 20, 2006

- The lagg is a transition zone – a buffer from outside influences - that performs three functions and that each of these three functions must be in existence and working together or you haven't a naturally functioning lagg --- they are integrated, not independent:
 1. Hydrological
 2. Hydrochemical
 3. Ecological

- Desired attributes:
 - Hydrological
 - Controls water table level of the Bog
 - Depth
 - Water movement, flow and distribution in association with elevation
 - Annual variations

 - Hydrochemical
 - Water chemistry gradient switch from acid dominated waters to increasing calcium and basic waters --- calcium and magnesium never above 'x'.
 - pH range
 - Biological filtration. 'Traps' incoming nutrients.
 - Annual variations

 - Ecological
 - Transition from organic to mineral soils
 - Buffer for invasive species and fire and other outside influences
 - The outside perimeter of a natural sequencing/gradient of *Sphagnum* species.
 - Healthy plant mosaic of low woody or non-woody vegetation. Hardhack Thicket *Spirea* and the Mixed Conifer Forest (Red Cedar-Skunk Cabbage complex in particular) most exemplify the lagg.
 - Variation in width and from an upland edge to a diffuse transition zone .
 - Ecological link between the Bog and the surrounding landscape
 - Natural contours, not right angles

Burns Bog Research and Monitoring Strategy Outline

Draft April 26, 2006

1.0 Introduction

- Brief background on Burns Bog
- Hebda and McDade documents
- Brief history of Scientific Advisory Panel, etc
- Map of Burns Bog

2.0 Structure of a Burns Bog Research and Monitoring Strategy

- Scientific Advisory Research Team
 - Membership
 - Terms of Reference
- Time frame
- Rationale why we need to restore Burns Bog, conduct research and monitor our approach.
- Previous Research
- Context of climate change is critical.
- Outline the three fundamental components of this strategy:
 1. Gather fundamental baseline data such as a water balance model, topography and elevations, water flow and hydrochemistry, etc --- as a necessary component for future research.
 2. Develop a monitoring strategy --- brief description of what is required on an annual basis and associated with various research
 3. Outline a research strategy based on the following themes:
 - Hydrology and Hydrochemistry
 - Bog Community Ecosystems, Processes and Key Species
 - Forest Management
 - Lagg
 - Wildfire
 - Invasive Plants
 - Rare and Endangered Species

3.0 Strategic Approach and Principles

- Must incorporate the research framework previously approved by SAP

RESEARCH FRAMEWORK: *Return Burns Bog to an ecological condition shaped by raised bog processes, buffered from disruptive or disturbing adjacent processes on the landscape. Achieve this ecological condition by maintaining characteristic ecological processes, structure and biota interacting over time, while recognizing the directional forces of urbanization, adjacent land uses and climate change. Measure and analyze the ecological condition using the following indicators:*

- *Characteristic ecological processes: hydrological systems and water chemistry, peat accumulation, trophic interactions, connection with adjacent ecosystems and landscapes.*

- *Structure and composition: the set of plant species or communities that define the bryophyte dominated shrubby structure and function of the bog habitat.*
 - *Biota: the set of key, rare and/or critical acidophilic species (plants, vertebrates and invertebrates) that are collectively capable of natural or progressive evolution into other related bog ecosystem(s) with ecological integrity.*
 - *Timeframe: 100 years.*
- Ecosystems share a basic set of attributes called Essential Ecosystem Characteristics (EEC's) as outlined in the March 2000 Ecosystem Review by Hebda.

Ecosystem Characteristic	Description and Indicators
Habitat Quality	▪ Landscapes and community diversity; connectivity and fragmentation; habitat structural diversity
Integrity of the Biotic Community	▪ Biodiversity; trophic structure; key or critical species
Ecological Processes	▪ Production and decomposition; biogeochemical cycling; succession; dispersal and migration
Water Quality	▪ Biological, chemical and physical characteristics
Hydrological System	▪ Water flows, storage and supply; structural characteristics
Disturbance Regime	▪ Fire; floods; storms; drought; disease or pest outbreaks; anthropogenic influences
Sediment/Soil Quality	▪ Biological, chemical and physical characteristics; erosion and accumulation

- A systematic framework and clear operating principles are required. Certain research and monitoring strategy characteristics are necessary:
 - Template --- format, expect certain approach
 - Standards --- peer review, do's and don'ts of research as Bog so sensitive, monitoring to be built in.
 - Scope and focus --- applied to bog restoration only and to facilitate management decisions
 - Integration and Collaboration --- link to each other, encourage collaboration, etc
 - Communication --- important to communicate results, not only among researchers and within the scholarly and applied community, but also to the people living in and adjacent to Burns Bog.
 - Use of Volunteers. When appropriate, who and under what circumstances?

4.0 Gathering Baseline Data

- Description of why it is essential to gather baseline data.
- Listing of what baseline data is crucial and the status of each:
 - Water Balance Model. In its simplest form the water balance appears as **Water in minus water out equals change in water stored.**
 - Water Levels based on true elevations
 - Water Chemistry
 - Lagg Existence
 - Topography and Elevations
- During discussion it was stressed on numerous occasions how important it is to calculate the actual water balance data and information for Burns Bog --- because in the big picture it is the water balance that we are trying to manipulate. This was discussed in the March 2000 Ecosystem Review – Section 4.2.5.6 Water Balance, but it requires updating. We need to determine the water loss by evaporation, evapotranspiration and the interception by trees/shrubs that prevents water even getting to the Bog. It is important to get a sense of how much it would cost to determine an updated water balance model, so that the associated agencies can budget for the work.

5.0 Monitoring Strategy

- Acknowledge/incorporate Munson’s July 2005 Ecosystem Restoration outline and the requirement that data be gathered annually.
- General description of monitoring to date --- what information is being gathered, who is collecting the data, the operations that Delta and Gateway have underway, etc and what the data to date indicates.
- Annual projection of cost.
- Outline of monitoring in all future research.

6.0 Research Strategy

- Each research themes will be detailed, including a literature review.
- The following research approach was suggested which brings together the EEC framework with the research themes themselves. The suggestion was that this table may help define research priorities.
- Effort needs to be made to connect this table with the indicators outlined in the SAP research framework itself.

EEC's	Research Themes						
	Hydrology Hydrochemistry	Forest Mgmt	Lagg	Wildfire	Invasive Plants	R/E Species	Bog Ecosystems
Habitat Quality							
Biotic Community							
Ecological Processes							
Water Quality							
Hydrology							
Disturbance Regimes							
Sediment/ Soil Quality							

- The need to explore the following key research questions was discussed at the meeting. Establishing research priorities based on what hypotheses need testing is an important conversation that requires further examination.
 1. Evaporation Rates. How do evapotranspiration rates compare between three various ecosystem regimes: Sphagnum, open water and tree/shrubs.
 2. Linking hydrology to micro-topographic forms: such as hummocky, lawn/carpet and mud bottom. Such data as depth, water fluctuation and annual variance would be valuable.
 3. Wildfire Modeling
 4. Lagg-Bog Transitions --- hydrology and hydrochemistry in particular.
 5. Forest Management and Bog Restoration
 6. Invasive Species and Water Type

5.0 Next Steps

1. Agree on base line, monitoring and research priorities.
2. From this priority list, develop a preliminary budget that outlines the cost of gathering the required baseline data, the annual cost for monitoring and the projected research costs.
3. Develop this research and monitoring strategy in more detail.
4. Confirm the next phase/Terms of Reference for the Scientific Advisory Panel to guide this process.