



## **Additional Information Requirements for Cranberry Operations**

Pursuant to Section 5(2) of the *Environmental Impact Assessment Regulation* of the *Clean Environment Act*, this document is intended to assist proponents in preparing a registration submission for projects involving the above-mentioned sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide. Note that the following items are requirements **in addition to** those outlined in the Registration Guide. The information requested in the Registration Guide must also be provided. The information requirements for evaluating a cranberry development of any size are inherent to the proposed development site and must be examined on a case by case basis. For further assistance, please contact the Sustainable Development, Planning and Impact Evaluation Branch, Department of Environment at (506)-444-5382.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and in the Registration Guide.

### **Definition**

These guidelines are applicable to all cranberry operations in the province of New Brunswick that are subject to review under the *Environmental Impact Assessment Regulation*. Schedule "A" of the Regulation lists a number of "triggers" which could result in an EIA review of a cranberry operation.

### **Cranberry Development EIA Triggers**

The four primary triggers for determining if a proposed cranberry operation requires an Environmental Impact Assessment (EIA) screening as per *Schedule A* of the *Environmental Impact Assessment Regulation*, are as follows:

- a. transfer of water between drainage basins;
- b. anticipated impacts on existing bogs or wetlands 2 hectares or greater in size;
- c. anticipated impacts on unique, rare or endangered environmental features; and
- d. operational water systems with a capacity to draw greater than 50 cubic meters of water per day directly from groundwater or surface water sources (e.g. wells). All surface water withdrawals (e.g. from streams, rivers, lakes and wetlands) will be assessed on a case by case basis to determine if this EIA trigger applies to the proposed project.

### **Note:**

- All cranberry developers (proponents) should submit two copies of the information required in the Registration Guide along with supplemental requirements from this document for an initial review by the Project Assessment Branch of the Department of Environment;
- If it is determined that an EIA review is required, the proponent will be advised to submit the required copies of the completed Registration document with attachments (maps, drawings, etc.) together with a covering letter;



- If it is determined that an EIA review is not required, the proponent will be advised of this by letter from the Department. In this case the proponent will still be responsible for obtaining any other required permits and approvals. These may include a Watercourse Alteration Permit, and any required authorizations or approvals from the Department of Natural Resources and the Department of Agriculture and Aquaculture to occupy Provincial Crown lands; and
- For further information, contact the Environmental Assessment Section at the number provided above.

### **Pre-EIA Registration Consultation**

If a proponent's project falls under one of the triggers mentioned above, it is strongly recommended that the proponent attend a pre-EIA registration meeting, prior to registration of a Cranberry development project. At this meeting Technical Review Committee (TRC) members would be given an opportunity to review and comment on the proposed cranberry development. In addition, it is also an opportunity for the proponent to ask TRC members questions with respect to what they require as part of the EIA screening process. Typically, after these meetings the proponent, as well as the TRC, has a better understanding of each other's objectives/roles in relation to the proposed project.

It is essential that the proponent bring the following information to the meeting which will allow the TRC to give the proponent accurate project specific guidance.

- a. Be familiar as possible with the proposed site by completing a preliminary site survey, which should include driving and/or walking the site prior to the meeting;
- b. Provide map(s) indicating the site location. An aerial photo map would be preferred;
- c. Be prepared to discuss any future phases of the project;
- d. Provide wetland mapping which can be obtained from the Department of Natural Resources, Fredericton, N.B. at (506) 444-5000 or [dnr.MappingPhotos@gnb.ca](mailto:dnr.MappingPhotos@gnb.ca). Appropriate fees will apply for accessing this data base;
- e. Provide details of the proposed source of operational water (ground or surface water). Provide an estimate of water required to initially bring the system to operational status and of the monthly make-up water requirements (e.g. water required compensate for evaporation, etc.). Describe the water system (e.g., open or closed) and indicate the proposed source water pump capacity for reservoir filling/replenishment. If surface water is the proposed water source, list all upstream and downstream users of the watercourse;
- f. If applicable, provide information on the nearest sand source;
- g. Provide preliminary engineering design for bed, berm, reservoir construction;
- h. Identify the pesticides proposed for use on the proposed site, including a pesticide management plan; and
- i. If applicable, identify any Crown lands within the project site and contact the Department of Agriculture and Aquaculture with respect to the availability of these lands for agricultural purposes.



## Wetland Development Criteria

**Note: development of cranberry operations in upland areas is the preferred approach for avoiding impacts to wetlands and must be evaluated as a potential alternative for all cranberry developments.**

Cranberry related projects that fall partially or wholly within a wetland or regulated buffer are subject to the New Brunswick Wetland Conservation Policy and the requirements of the *Watercourse and Wetland Alteration Regulation* (80-90) under the *Clean Water Act*. The objectives of Policy are to ensure no loss of Provincially Significant Wetland and no net loss of other wetland function. In order to achieve the policy objectives, the following three criteria must be evaluated before a cranberry development is considered within a wetland or regulated wetland buffer:

- Demonstrate that all opportunities for avoiding wetland impacts have been maximised at the planning stage;
- Demonstrate that all opportunities for minimising any unavoidable impacts to the wetland will be implemented; and
- Provide compensation options for all residual permanent impacts to wetlands.

***Opportunities for avoiding wetland impacts:*** A rationale must be documented, which thoroughly explains why a development must take place within a particular wetland area. For a typical cranberry operation, the rationale usually includes the proximity of an area of suitable topography and size to adequate sources of sand, water, power, land ownership, accessibility, and proximity to workforce and transportation infrastructure which are not found at other locations.

Should it be demonstrated that a proposed parcel(s) of land within a wetland contains all of the right features for cranberry development, and there are no feasible alternatives, opportunities to plan the development in a fashion that would minimize the impacts to the wetland must be fully explored. Mitigation (or compensation) in accordance with the New Brunswick Wetland Mitigation Guidelines of all unavoidable permanent wetland impacts (typically includes infilling for construction of roads, berms, building placement, etc.) will be required.

Compensation for wetland impacts is only considered once it has been satisfactorily demonstrated and accepted that all opportunities for avoiding wetlands and all opportunities for minimising the wetland disturbance have been exhausted. The compensation requirement will depend on the type and function of wetlands impacted as well as the type of compensation being proposed (i.e. restoration of other degraded wetlands, creation of wetlands, and enhancement of wetlands). Proposed cranberry operations will not be considered within Provincially Significant Wetlands or within 30 meters of the perimeter of Provincially Significant Wetlands. Provincially Significant Wetlands are wetlands that have been recognized as having provincial, national or international importance, and these include among others, coastal wetlands and wetlands hydrologically connected to the Saint John River below the Mactaquac Hydro Dam that fall within the flood plain.



For a complete list of PSWs, please contact the Department of Environment or consult the Department of Natural Resources Wetland Inventory Database.

## 1.0 THE PROPONENT

See Registration Guide

## 2.0 THE UNDERTAKING

### iv) Project Location:

- Provide a 1:10,000 map indicating site location and a colour aerial photograph of the site;
- All other peat and cranberry developments and agricultural activities within the watershed should also be indicated; and
- Note that cranberry developments will not be permitted to affect ombrotrophic bogs outside of Ecoregions 5 and 6, salt marshes, or other Provincially Significant Wetlands as defined and identified by the Departments of Natural Resources and Environment (see attached map, Appendix 3).

### (iv) Physical Components and Dimensions of the Project:

Provide a detailed description of the proposed project, addressing the requirements contained in the Registration Guide. For this class of project the required information includes but is not limited to the following:

- Outline the features and boundaries of the project on the aerial photograph, so that the features visible on the photograph are not obscured (e.g. use an acetate overlay or an electronic equivalent, or provide a second unmarked air photo) showing topographic contours, bed location, acreage of beds, water sources, and possible pumping locations and retention areas;
- Provide a drainage plan showing primary and secondary ditches, sedimentation ponds and the dimensions of each; and
- If the project will consist of different phases that will be implemented over time, be sure to provide all available details on the location and layout of the future phases.

### Boreholes

- In order to collect project related information, boreholes are permitted to be developed if permission of the property owner is obtained; if the project occurs on Crown lands the proponent must contact the Department of Natural Resources for the appropriate permit.

### vii) Construction Details:



Provide a detailed description of the proposed construction activities and methods, addressing the requirements contained in the Registration Guide. For this class of project the required information includes but is not limited to the following:

- Describe the types of soil existing on the proposed site (clay, sand, etc.);
- Provide details of run-off management to be employed during construction;
- Provide preliminary designs of any temporary watercourse diversions;
- Describe the method of construction of any required reservoirs or retention ponds;
- Indicate the location of any stockpiles of imported fill materials (e.g. sand, clay) and the source of these materials;
- Characterize the type of sand (e.g. grain size, presence of fines) to be applied to the cranberry beds;
- Describe the method used for clearing/removal of vegetation;
- Describe the proposed method of removal and disposal of grubblings (chipping, buried, hauled away, etc.); and
- Describe the method of cranberry planting.

viii) Operation and Maintenance Phase:

Provide a detailed description of the proposed project's operation and maintenance characteristics, addressing the requirements contained in the Registration Guide. For this class of project the required information includes but is not limited to:

Water Supply

- Provide details of the proposed source of operational water (i.e. municipal water supply, water supply well, retention pond, pumping from watercourse, etc.);
- If water will be obtained from ground or surface water, indicate the proposed pump capacity;
- Describe the location, size, capacity, and retention time for the system's retention pond and tailwater recovery ponds, as applicable. Describe the overflow location and the receiving watercourse(s) or environment for the retention pond and tailwater recovery ponds;
- Provide a proposed nutrient management plan that mitigates any potential nutrient loading of adjacent wetlands and/or watercourses;
- Provide the proposed dimensions of the ditching and the beds including cross sectional drawings; and
- If water will be pumped from a watercourse, list all upstream and downstream users of the watercourse. Discussion with Department of Environment is recommended to determine the level of detail required on a case by case basis. Note that if the potential daily capacity for water withdrawal from ground or surface water will be in excess of 50 cubic metres per day then a Water Supply Source Assessment shall be required. Contact the Sustainable Development, Planning and Impact Evaluation Branch for further details or consult the guideline [Additional Information Requirements for Water Works and Water Supply Projects](http://www.gnb.ca/0009/0377/0002/0001/0005-e.pdf), which can be found <http://www.gnb.ca/0009/0377/0002/0001/0005-e.pdf>;



- If water supply will be obtained from adjacent lands, a water balance for the proposed system on a monthly basis, taking into consideration estimated losses due to evaporation and infiltration, should be presented, to ensure that there is an adequate supply to meet the demand. This should also include data on local climate and precipitation and the discussion should highlight extreme wet and dry years. State any assumptions used to calculate this;
- The anticipated permeability (hydraulic conductivity) of the beds, reservoir and retention pond should also be identified; and
- If a dam is being considered, the extent of the proposed flooding is to be clearly marked on a map, including ownership information of all affected land. Preliminary engineering drawings should be provided. Provisions for fish passage may also be required. See also the guideline [Additional Information Requirements for Projects Involving Dams, Impoundments and/or Causeways](http://www.gnb.ca/0009/0377/0002/0001/0009-e.pdf), which can be found <http://www.gnb.ca/0009/0377/0002/0001/0009-e.pdf>;

### Pesticides

- Note that under the New Brunswick Department of Environment's Pesticides Control Act, any employee using a pesticide must hold a valid Pesticide Applicator's Certificate – Class L (Private Pesticide Use). If the proponent hires a contractor to apply pesticides, the contractor's business must hold a valid Pesticide Operator's Licence, A Pesticide Use Permit, and all individuals using a pesticide must hold commercial Pesticide Applicator Certificates – Class B (Agriculture);
- Provide a pesticide management plan including proposed methods and timing of application, storage of pesticides on-site, disposal of pesticides and/or containers, and contingency planning for pesticide spills. Note that the facility design should provide for adequate containment of stored chemicals so as to prevent release to the environment in the event of a spill. Ideally this would include chemical storage areas with containment capability. Pesticides must be stored on site in a manner approved by DENV. Identify the pesticides proposed for use, using the Pest Control Product Number (PCP #), the product trade name and the active ingredient(s) or alternately, provide the Safety Data sheets for each pesticide to be used;
- Describe any integrated pest management (IPM) practices considered for used for the operation; and
- Provide a proposed pesticide monitoring plan, including but not limited to, identification of any residential wells in the vicinity of the project, proposed locations of monitoring wells, if applicable, reservoir and tailwater recovery monitoring, monitoring of nearby watercourses, groundwater, and wetlands that potentially could be impacted by pesticide release;

### **3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT**

Include all relevant environmental features as noted in the Registration Guide. Features of particular relevance to this class of project may include but are not limited to the following:



### *Watercourses, Fish and Fish Habitat*

- If water withdrawal, the discharge of an effluent, or a diversion will affect a watercourse (lake, river, stream or wetland) then a written description of the affected watercourse (and photographs if available), should be provided and should include the following information:
  - the name of the watercourse and its discharge location;
  - the channel width and water depth of the watercourse (see fish and fish habitat survey forms – Appendix 1);
  - the seasonal flow within the watercourse for all four seasons;
  - the composition of the substrate;
  - the presence/absence of fish, including seasonal use by fish as determined by a fish habitat survey;
  - a description of the methods used to sample fish (electro-seining, netting, timing of sampling). All commercial species that are found on or near the site of the proposed development should be identified. **Please note: fish and fish habitat surveys must be conducted at base summer flows;**
  - the surrounding vegetation;
  - the use of the watercourse by anglers or other recreational users;
  - any known water withdrawal and/or water effluent discharges to the watercourse in the vicinity of the proposed project;
  - the proximity of any approved shellfish harvesting sites; and
  - baseline water quality data. (The parameters to be sampled for the water quality data include pH, suspended solids, basic chemistry and temperature, stream flow maintenance, etc).

### *Wetlands*

- The following information must be provided if a wetland 2 hectares or greater in size will be impacted:
  - A wetland delineation exercise must be conducted by a qualified delineator and submitted as part of the EIA registration document (contact DENV for a current list of delineators). **Please note – wetland delineations must be conducted between June 1 and September 30.** Contact the Environmental Assessment Section, DENV, at 444-5382 for a current list of qualified wetland delineators;
  - If a wetland will be affected by a proposed development, the methods described in Appendix 2 must be utilized to conduct a “Rare and Endangered Vascular Plants Survey” of the entire wetland area to be affected by the development (including all areas proposed for draining) to the limits of any hydraulic effect of the development. In the case of wetlands on Crown land, the survey must be conducted of the entire wetland. The complete report **must** accompany the EIA registration document. **Please note - most rare plant surveys must be conducted in August; however for some species this requirement may vary depending on bloom time of the plant and may require earlier or later surveys and/or additional surveys.** Discussion with DNR of site location is recommended. If rare and endangered species are



discovered, the proposal will not receive environmental approval unless it can be determined that there is no potential for impacts to the portions of the wetland containing these species or communities. The names and qualifications of the individuals involved in conducting the surveys should be specified; and

- A history of the use of any wetlands in the watershed, including peat mining and cranberry operations must also be provided.

### *Migratory Birds*

- Migratory birds (both landbirds and shorebirds) are protected under the Migratory Bird Convention Act, 1994 ([http://www.cws-scf.ec.gc.ca/legislations/laws1\\_e.cfm](http://www.cws-scf.ec.gc.ca/legislations/laws1_e.cfm)). If no mitigation measures for preventing impacts to migratory birds are proposed, a preliminary assessment of migratory bird species may be required. General Guidelines for Landbird Surveys can be found in Appendix 3; and
- Clearing activities for any project should avoid the nesting period of **May 1 to August 30**, although for some species the nesting time may vary. Consultation with CWS is recommended if any ground-nesters, species at risk, or species of conservation concern are identified in a preliminary assessment.

### *Archaeological Resources*

- A preliminary archaeological survey may be required, based on site location and initial desktop modeling analysis, and must be conducted by a licensed archaeologist. Any preliminary test-pitting required to ascertain whether archaeological resources are present should be conducted during periods of low water for maximum depth to be achieved. Preliminary surveys along watercourses should also be conducted at low water levels to allow for erosional faces and exposed beaches to be examined for evidence of human activity. In areas away from watercourses, surveys and test-pitting should be conducted in the absence of snow and before ground freezes.

### *Crown Land*

- If the proposal involves Provincial Crown lands, approval from the Department of Agriculture and Aquaculture and/or the Department of Natural Resources will be required. Please contact the Land and Environment Branch at the Department of Agriculture and Aquaculture for further information. Discussion with DAA should be initiated prior to the EIA registration. Please note that Crown lands under the control of the Department of Natural Resources may be made available for agriculture applications as per a Memorandum of Understanding between the Department of Agriculture and Aquaculture and the Department of Natural Resources; and
- Where a project is located on Provincial Crown lands, or may affect the Aboriginal use of Crown lands and resources for traditional purposes (e.g., hunting, fishing, gathering), it may potentially infringe upon Aboriginal and treaty rights and, thereby, trigger the duty to consult. Discussion with the Department of Agriculture and Aquaculture and the Aboriginal Affairs Secretariat should be initiated prior to EIA registration of the project,





regarding applicable policies and procedures (this does not negate the need to consult Aboriginal communities and/or individuals as part of the Public Consultation process that is required under the EIA regulation for every registered project).

#### *Groundwater*

- The quality and quantity of groundwater resources and the depth to groundwater table in the project area and the location of the nearest wells should be described.

### **4.0 SUMMARY OF ENVIRONMENTAL IMPACTS**

All anticipated impacts should be described and discussed. These will depend on the scope and complexity of the project as well as the project location. The impacts resulting from this class of project may include but are not limited to the following:

- A project may affect a watercourse either directly or indirectly. Examples include: (a) works within a watercourse, including any watercourse diversions, bridges, etc., (b) water withdrawal, (c) discharge of runoff to a watercourse d) removal of streambank vegetation, and e) construction or operational activities in proximity to a watercourse. Any anticipated impacts resulting from such activities must be described;
- It is important for the proponent to realize that maintenance of an adequate flow for fish and downstream water users is required in watercourses. This could potentially be a limiting factor when withdrawal of water from watercourses is being considered. Please note that if water withdrawal from a watercourse is anticipated, the federal Department of Fisheries and Oceans' "Freshwater Intake End of Pipe Fish Screen Guidelines" must be followed;
- Other examples of potential impacts that must be addressed include:
  - effects on groundwater quality or quantity;
  - water quality impacts and potential flooding by discharge to watercourses;
  - noise from pumps and other construction and agricultural equipment (booms, tractors, heavy machinery, etc.);
  - impacts on peatlands outside of the footprint of the operation; and
  - impacts resulting from emergency release of water or spillage of chemicals (fuel, pesticides, and fertilizers).

### **5.0 SUMMARY OF PROPOSED MITIGATION**

Describe all mitigative measures that will be employed to minimize the potential environmental impacts identified above. For additional guidance, see the Registration Guide.



Note that a minimum 15-meter buffer zone between the facility and all neighbouring properties is required, unless prior written authorization is obtained. This buffer is to be indicated on the site plan.

## **6.0 PUBLIC INVOLVEMENT**

See Registration Guide

## **7.0 APPROVAL OF THE UNDERTAKING**

See Registration Guide

## **8.0 FUNDING**

See Registration Guide

## **9.0 SIGNATURE**

See Registration Guide

## **10.0 SUBMISSION INSTRUCTIONS**

See Registration Guide

### **Specific Appendices**

- Fish and Fish Habitat Survey Forms (Appendix 1)
- Surveying of Vascular Plants in Peat Bogs (Appendix 2)
- Ecoregions 5 and 6 available for cranberry development (Appendix 3).









## Detailed Stream Habitat Survey

The detailed habitat survey has been designed to collect specific aquatic habitat information. The detailed survey should be completed at low base summer flows when available habitat is limiting. Two or three person field crews are required to perform the detailed habitat survey.

### Form Header

- **River** - name the river system (including branch, if applicable)
- **Start point** - identify using permanent or measurable features; identify on field map; record starting point of stream survey section for each day
- **End point** - identify using permanent or measurable features; identify on field map; record ending point of stream survey section for each day
- **Personnel** - provide names of personnel
- **Date** - provide date (year/month/day) of stream survey
- **GIS Map No.** -
- **Drainage Code** - can include up to 5 drainage codes
- **Stream order No.** (from map or table)
- **Stream/River No.** (a unique No. available from DNR)

### Columns

#### 1. Reach No.

Reach numbers are predetermined during mapping to facilitate locating the fieldwork. More than one reach may be completed each day so it is important to identify start and end points where necessary.

#### 2. Unit No.

Unit numbers are consecutive numbers representing each habitat type identified within the stream.

*Exception: The unit number is repeated where there is a main and side or a split channel combination identified.*

#### 3. Stream Type

Identify and record stream habitat type from table below (see Glossary for descriptions).

STREAM HABITAT TYPE				
FASTWATER		POOLS		
1. Falls	6. Sheet	10. Midchannel	15. Plunge	19. Log Structure
2. Cascade	(ledge)	11.	16. Bogan	20. Road Crossing
3. Riffle (Gr/Rb) <sup>1</sup>	7. Chute	Convergence	17. Eddy	21. Wood Debris
4. Riffle (Rk/B) <sup>2</sup>	8. Run	12. Lateral	18. Gabion	22. Man-Made Dam
5. Riffle (Sand)	9. Rapid	13. Beaver		23. Natural Deadwater
		14. Trench		

Note: <sup>1</sup> Gr/Rb = gravel / rubble riffle    <sup>2</sup> Rk/B = rock / boulder riffle

#### 4. Channel Type

Denotes the configuration of the channel in each habitat type (see table for details).

CHANNEL TYPE			
1.	Main	-	the primary stream containing the major stream flow
2.	Side Channel	-	a secondary channel containing a portion of the stream flow from the main channel
3.	Split	-	if stream is split into various different habitat types
4.	Bogan	-	area of slow moving water partially isolated from the flow of the main channel

- If there is a main/side channel or a split combination identified, the channel position is specified left (L), right (R) or middle (M). If stream has braided further, lump channels accordingly.

#### vi) Length (m)

- The length of each stream type.

#### vii) Width (m)

- The wetted width of each stream type using a survey pole, chairman or best, optical range finder.

#### viii) Bank width (m)



- The bank width of each stream type identified by mean high water level or width between the initiation of riparian roots exposed by high water.

**ix) Substrate Code**

- Based on the chart below, identify and record the percent of substrate represented in each stream type.
- The total percent of substrate will equal 100%, with no single value less than 5%.

<b>SUBSTRATE CODE</b>			
1. Bedrock, Ledge			
2. Boulder	=	>	461 mm
3. Rock	=	180	- 460 mm
4. Rubble	=	54	- 179 mm
5. Gravel	=	2.6	- 53 mm
6. Sand	=	0.06	- 2.5 mm
7. Fines	=	0.0005	- 0.05 mm

**x) Estimated Average Depth - Wet Width (m)**

- The mean depth of the wetted portion of each stream type; use a graduated pool or meter stick.

**xi) Undercut Bank (%)**

- Visually determine the percent of the length for both the left and the right stream bank separately that is undercut, but covered with water, for each stream type.
- This value does not exceed 50% for either the left or right stream bank providing a total no greater than 100% for both banks.
  - i.e. length of stream type = 100 m  
 right bank has 50 m undercut bank = 25% of total length  
 left bank has 10 m undercut bank = 10% of total length
- Note: The total available length of undercut bank is 60 m.

**xii) Overhanging Bank Vegetation (%)**

- The percent of the wetted area covered by terrestrial vegetation that actually touches or nearly touches the water thereby providing overhead cover for fish.
- This value does not exceed 50% for either the left or right stream banks providing a total no greater than 100% for both banks.
  - i.e. area of stream type= 100 m<sup>2</sup>

right side has 50 m<sup>2</sup> overhanging vegetation= 50%

left side has 25 m<sup>2</sup> overhanging vegetation= 25%

- each side can have a maximum of 50 m<sup>2</sup>.
- total stream area of overhanging vegetation = 75%

**xiii) Large Woody Debris in Stream (m)**

- An estimate of the total meters of woody debris (10 cm in diameter or greater) within the wetted area for each stream type.

**ix) Flows**

1) Type

- Identify the type of flow being measured (see table for details). The main stream flow should be measured at least every stream order whereas every tributary stream, spring or spring seep should be measured and recorded.

FLOW TYPE	
1. Survey Stream	
2. Spring	- water source to river/stream bottom (upwelling)
3. Brook/ River Tributary	- stream entering survey stream
4. Spring seep	- water without a discernable channel flowing into survey stream

- 2) See Reconnaissance Section 2(ix) for details on flow calculation methodology

3) Time

- Based on 24 hour clock, record the time temperatures were taken.

4) Temperature  
Air/Water (°C)

- Temperatures between 1300hrs and 2100hrs are especially important to obtain a more accurate representation of daily high temperature that often determines an ecosystem reach.
- If possible also obtain a morning temperature to determine the extent of fluctuation.
- Note: do not take air temperature in direct sunlight.

**xv) % Substrate Embeddedness**

- Remove various pieces of rock and/or rubble from the streambed of each stream type, estimate the percent embeddedness into sand

and fines, and record the number (chart below) for the criteria represented.

- If rock and/or rubble substrate is not present, % substrate can not be calculated.

EMBEDDEDNESS	
NUMBER	CRITERIA
1	≤ 20%
2	20 - 35%
3	35 - 50%
4	≥ 50%

**xvi) Comments**

- Using the checklist of land -water use attributes, record appropriate number(s) for each stream type.

**Please Note:** Record any additional information pertinent to the habitat unit, such as pool name fishes present, etc., on the line directly below the habitat unit information line. Use as many lines as you wish to detail your observation(s).

**The reverse side of the inventory form is optional; it has been designed to be used for a DFO salmonid modelling exercise; persons interested in applying this technology should contact DFO's habitat biologist in Halifax, NS (902-426-3573) to apply data to the intended habitat model.**

**xvii) Additional DFO Survey Parameters**

- Divide each Reach into Site numbers equalling 50 m intervals  
i.e., Reach 1, Site 1 is the first 50 m interval  
Reach 2, Site 2 is the second 50 m interval.

**xiii) % Site**

- Estimate the percent of the riffle/run stream type and the percent of pool stream type within the 50 m interval.

**xiv) Shade (%)**

- Estimate the percent of the stream type which would be shaded between 1000hrs and 1400hrs.

**xv) Stream Banks**

- 1) Vegetation (%)

- Estimate the percent of bare ground, grasses, shrubs and trees for each of the stream banks.
- These stream banks will have a direct impact on the stream.
- Additive values should not exceed 100%.
- Note: Shrubs category includes alders, dogwood and willows.

2) Erosion (%)

- Estimate the percent each stream bank is stable, bare stable or eroding.
- This value does not exceed 50% for either the left or right stream banks providing a total no greater than 100% for both banks.

<b>EROSION</b>		
Stable	-	Stream banks covered in vegetation
Bare stable	-	Stream banks are rock or root bound.
Erosion	-	Stream banks are eroding, sediment being lost to the stream.

**xvi) Water Quality (when equipment is available)**

- 1) O<sub>2</sub> - Oxygen of the river/stream system, measured in mg/l.
- 2) pH - The pH of the river/stream system.

**xvii) Depth**

- 1) Wetted
  - within the 50 m interval, measure the wetted depth of the riffle/run stream types at 1/4, 1/2 and 3/4 of the distance of the wet width.
- 2) Channel
  - within the 50 m interval, measure the channel depth of the riffle/run stream types at 1/4, 1/2 and 3/4 of the distance of the channel width.

**xviii) Pool Rating Criteria**

- 1) No.
  - determine the pool depth then estimate the percent of stream cover.
- 2) Letter
  - determine the percent of the pool within

**xix) Pool Tail**

- 1) Embeddedness
  - see xvi)
- 2) Mean Substrate Size
  - visually determine mean substrate size
- 3) % Fine
  - estimate the percent of fines (includes sand)

**xx) Turbulence (%)**

- degree of disruption of surface water resulting in reduced water visibility

**Materials Required for Stream Inventory**

**Side one and Side two**

DNR/DFO Stream Survey and Habitat Assessment Form  
(Waterproof paper)

Stream Code Numbers - predetermined in the mapping  
exercise

Aerial Photos

Clipboard

Pencils

Chainman and String (plus spare rolls)

Thermometer

Meter stick or 3-metre canoe pole with measured increments

Measuring Tape

Whiffle ball (flotation device)

Stopwatch

Flagging Tape

For additional information on the above please contact the Fish and Wildlife Branch of the Department of Natural Resources (Tel: (506) 453-2440).

## APPENDIX 2

### RECOMMENDED METHODS FOR THE SURVEYING OF VASCULAR PLANTS AT RISK (RARE, THREATENED, REGIONALLY ENDANGERED OR ENDANGERED) FOR EIA OR SIMILAR STUDIES

#### INTRODUCTION

The purpose of this kind of survey is to document the presence or absence of vascular plants that are believed to have a degree of rarity over a selected area. Plants in this category are often inconspicuous and difficult to identify. Many of them are cryptic in the sense that they may be very similar to other, more common species. They are not distributed randomly and they are rare primarily because they have specialised habitats, which only occur sporadically across the landscape.

Vegetation analysis with random sampling techniques using small quadrates is definitely **NOT** the method to use to survey an area for plants at risk. Random sampling using quadrates provides a generalised analysis of the vegetation, which is not the object of this exercise. The object is to specifically search for those species that would rarely or never be found by random sampling because they are not a common element of the vegetation.

#### FIELD METHODS OF SURVEYING

1. Aerial photographs, geological and topographic maps should be consulted to obtain a general sense of the geology, topography, vegetation, roads and other important features of the area. Preliminary notes should be made of those areas, which might support populations of rare plants. Rock outcrops, stream outlets, and rich calcareous fens are some of the areas to note. Tentative survey routes should be drawn on the map and as many microhabitats as possible should be sampled, especially those suspected of yielding rare plants.
2. A search of relevant literature concerning rare plants of the area should be undertaken and those rare species of the habitat in question should be carefully studied, preferably from herbarium specimens if available. Notes should be made on these species and photostatic images of each taxon carried in the field.
3. In the field, the planned survey route should be followed as well as ground conditions allow. However, local conditions will dictate to some degree where the survey will be conducted. Survey coverage may be deemed adequate if the surveyor feels secure that a good sampling of all vegetation zones or ecosites has been accomplished. In this case, sampling means that a reasonable number of sites have been carefully and fully examined.

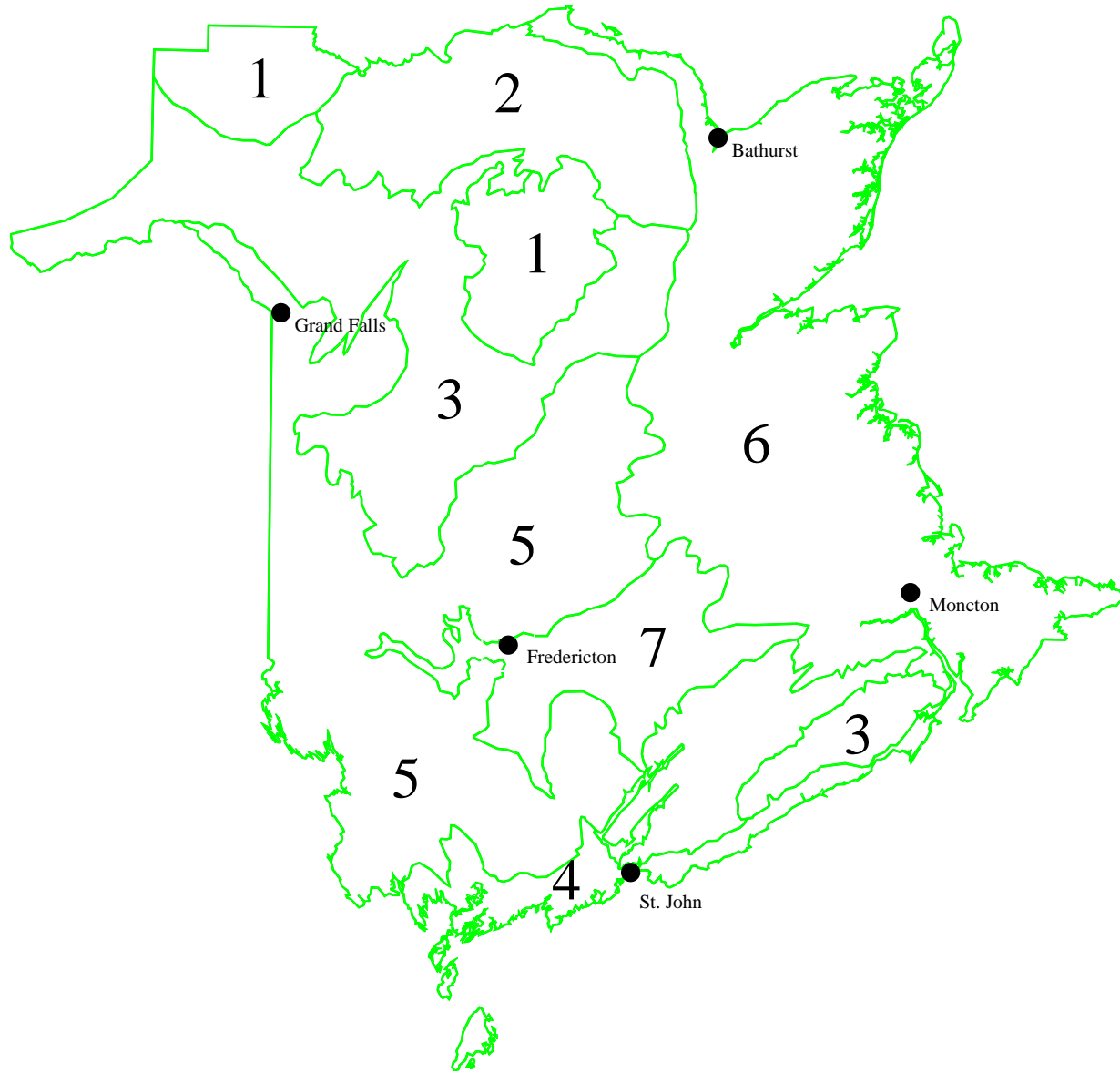
If the habitat is relatively homogeneous, less time need be spent sampling the area that if there are many different microhabitats. More species, including rare ones, will be found in an area of many microhabitats.

4. The survey botanist should be able to identify by sight the vast majority of the vascular flora of the area. It can be assumed, therefore, that any unidentifiable vegetation may be rare and a specimen should be collected for later identification in the laboratory. Notes on the habitat, number of plants in the population, and any other features that may assist in the identification should be noted. Flowers, upper and lower leaves and fruit should be collected if possible. These specimens, carefully labelled, pressed, dried and mounted will serve to document their presence in the area. Rare plant sites should be marked with conspicuous flagging tape and located as accurately as possible on the survey maps so that important populations may be found again if necessary.

The survey is to be done in August. Whenever possible, repeat surveys should be run in order to observe plants which may only be conspicuous in spring, summer or fall.

5. It should be remembered that many of the rare plants are grassy-sedgy-looking species or inconspicuous aquatics and not very showy. These taxa should be searched carefully along the survey route and all unknowns should be sampled.
6. As complete a list as possible of all the vascular plants should be compiled during the surveys and their relative abundance recorded before leaving the site (while it is still fresh in memory). Abundance classes may be recorded as follows:
  - (a) Rare at this site - only one or two populations observed.
  - (b) Three or more populations observed - mostly scattered.
  - (c) Uncommon at this site but found occasionally throughout.
  - (d) Observed consistently throughout, but coverage may not be large.
  - (e) Commonly found throughout, often with considerable coverage.
7. To help keep track of the distribution and numbers of unknown taxa, it is useful to give them a name based on some readily identifiable feature, e.g. prickly-fruit plant, yellow-orchid-like plant, etc. Once identified, the scientific name may be substituted.
8. Information generated in this way is of considerable importance to the New Brunswick Committee on Endangered Species and especially to the Plant Subcommittee. Please contact AC CDC or the New Brunswick Museum, Saint John if you have any questions concerning this methodology, to deposit specimens or to obtain assistance with identifications.

### APPENDIX 3 – Map showing Ecoregions 5 and 6



Ecoregion	# peatlands	% of ecoregion by area	% of provincial Peatland area	% of provincial bog numbers	# mined
1	4	0.04	0.13	0.49	0
2	4	0.03	0.13	0.49	0
3	23	0.15	1.60	2.82	0
4	40	1.05	2.05	4.90	0
5	235	1.74	28.28	28.76	0
6	472	3.96	56.77	57.77	31
7	39	3.23	11.04	4.77	0
Total	817	10.19	100	100.00	31

Source: Thibault, J. J. 1992. The New Brunswick peatland database. New Brunswick Department of Natural Resources and Energy, Mineral resources, Mineral resources Report 6, 84 p. Table adapted from Toner 1998. Working paper on the application of ecological land classification to wetlands. Forest Management Branch, New Brunswick DNR



# APPENDIX 3

## General Guidelines for Landbird Surveys for Environmental Assessment of Linear Right-of-Way Projects

Version: June 2007

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**Main Areas of Concern** (Note: These areas may vary depending on site-specific sensitivities)

- Long term declines of some bird species;
- Loss of habitat and species dependant on those habitats;
- Species which are little known or for which there exists little population information.

### General Approach

1. Establish a list of priority bird species for the area of interest, using all available sources, including sources for bird species at risk<sup>1</sup> and bird species of conservation concern<sup>2</sup>.
2. Using habitat maps (e.g. forestry, agricultural, wetland), screen the area for presence of broad habitat classes of avian concern, e.g. older/mature forest, interior forest, wetlands, grassland/agricultural, salt marsh.
3. Select out largest and/or the most significant of those habitats.
4. Establish protocol for surveys for each of the habitat types (see Survey Protocols below).
5. **Importantly**, consult with Canadian Wildlife Service of Environment Canada (CWS) and appropriate provincial departments (Natural Resources) regarding proposed methods and approach prior to the finalisation of survey planning.
6. Conduct surveys.
7. Analyse results by screening for occurrences of species at risk and species of conservation concern including, but not necessarily limited to, target species identified in consultations with government departments.
8. Write report. Include full database of results, conclusions and recommendations. Review with CWS.
9. Provide CWS with a full electronic, geo-referenced database of results.

### Survey Protocols

- Select a survey type that is most appropriate for obtaining information relevant to the case in hand. Survey types for consideration should include, but not be limited to, atlas-type surveys, point counts, transects and spot mapping.
- Surveys must be conducted during the peak of the breeding season (see Survey Timing below).
- Personnel highly skilled in identifying birds in the field should be used to conduct the surveys.
- Vocal playbacks should be used where beneficial (owl<sup>3</sup> survey, hawk<sup>3</sup> species, some wetland species, species that do not vocalise regularly).
- The areas where surveys are to be focussed should be prioritised in consultation with CWS.

### Survey Timing

- For owl<sup>3</sup> species and early woodpecker species – April.
  - For all other species – early June to early July.
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- <sup>1</sup> Those species listed under the federal *Species at Risk Act* (SARA) or protected under provincial endangered species legislation should be referred to as "Species at Risk".
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- <sup>1</sup> Species listed as Endangered, Threatened or Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) but not yet listed on SARA, species ranked May Be at Risk or Sensitive by the New Brunswick Department of Natural Resources (NBDNR), species ranked S1 to S3 by the Atlantic Canada Conservation Data Centre (AC CDC), and Partners in Flight Priority Species may be referred to as "Species of Conservation Concern".
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- <sup>1</sup> Appropriate provincial department should be contacted for advice regarding surveys under provincial management authority.
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