

Marker's use only

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

# 2008 MANITOBA ENVIROTHON MARINA & GOLF COURSE TRAILS

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## STOP 1

### Aquatics (10 points)

#### EQUIPMENT

The Red and Winnipeg Rivers both flow into the south basin of Lake Winnipeg. Together, they contribute much of the water that enters that lake. On display at the table are a container of raw Red River water, a filter paper through which was filtered 100 millilitres of this water, and the filtered water (filtrate) from the Red River.

A Secchi depth reading taken recently in the Red River at Winnipeg indicated a Secchi depth of 0.1 metres. Using the nearby dock and the Secchi disk provided, compare the Secchi depth reading for this portion of the Winnipeg River to the Red River reading.

Using the same dock and the container provided, dip a sample of water from the Winnipeg River. Using the filtration apparatus provided, place a clean filter paper in the apparatus, replace the top section of the filter funnel and clamp it securely in place, then filter 100 millilitres of the Winnipeg River water through the filter. Examine the residue on this filter paper, and the filtrate in the flask. Visually compare these with the demonstration filter paper and filtrate provided, which were obtained by filtering the same volume of Red River water.

10

Using the information gathered, and your general knowledge of these rivers, answer the following:

I) What does the Secchi disk measure? (1 point)

1

II) What does the Secchi depth tell us about the depth of algal photosynthetic production? (1 point)

1

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**Stop 1 - Aquatics (10 points) continued**

- III) Was the Secchi depth in the Winnipeg River greater or less than the Secchi depth recorded for the Red River? (1 point) \_\_\_\_\_  
1
- IV) What is the purpose of filtering the raw water sample? (1 point) \_\_\_\_\_  
1
- V) List four (4) possible materials that would commonly be found in the residue on the filter paper. (2 points - 0.5 each) \_\_\_\_\_  
2
- VI) Does the Winnipeg River filter have more or less residue than the filter from the Red River? (1 point) \_\_\_\_\_  
1
- VII) Given what you know about the lands drained by the Red and Winnipeg rivers, what material is primarily responsible for this difference? (1 point) \_\_\_\_\_  
1
- VIII) From the information that we have collected, which of these two (2) rivers would you expect to contribute more sediment to Lake Winnipeg? (1 point) \_\_\_\_\_  
1
- IX) What additional information do we require to verify that our answer to question VIII (above) is correct? (1 point) \_\_\_\_\_  
1

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ANSWER

- I) Secchi disk measures the vertical penetration of solar radiation (light) into the water column. (1 point - 0.5 each)
- II) Algal photosynthesis can be expected to occur to a depth approximately equal to **twice** the Secchi depth. (1 point)
- III) The Winnipeg River Secchi depth was much greater than the Red River Secchi depth. (1 point)
- IV) Filtration separates the suspended particles from the dissolved substances in the water. (1 point - 0.5 each)
- V) 4 of the following: (2 points - 0.5 each)
- soil (clay) particles,
  - algal cells (algae),
  - zooplankton (microscopic animals),
  - bacteria,
  - terrestrial plant particles (decaying leaves, seeds, pollen),
  - dust particles.
- VI) The Winnipeg River filter has **less** residue (1 point)
- VII) Clay (prairie soil) particles in the Red River are primarily responsible for the difference in the amount of residue. (1 point)
- VIII) The Red River deposits more sediment (1 point)
- IX) We also would need to know the volume of water carried into Lake Winnipeg by each river to confirm our conclusion. (1 point)

REFERENCE - Aquatics workshop material on sampling and productivity;  
CD: Water as Environment

**Stop 1 - continued**

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## Forestry (2 points)

Below is a list of Primary and Secondary products from the Forest industry in Manitoba. Secondary forest products means that value has been added to wood products. Circle only the products that are considered Secondary forest products.

<hr/> 2
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- |         |                |                              |
|---------|----------------|------------------------------|
| doors   | furniture      | kitchen cabinets             |
| windows | particleboard  | oriented strand board (OSB)  |
| plywood | pulp and paper | softwood and hardwood lumber |

ANSWER

kitchen cabinets, windows, doors, furniture (2 points - 0.5 each)

REFERENCE - Forestry CD: Manitoba Forestry - Growing opportunities for a sustainable, inclusive forest industry

## Soils (2 points)

Why is it important to preserve land for agriculture? Provide two (2) reasons. (2 points - 1 each)

<hr/> 2
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ANSWER

2 of the following (2 points - 1 each)

- protects our food production potential
- agriculture has a significant role in local provincial national and international economies
- protect future agricultural diversification and value added opportunities
- protect farms from encroachment and disturbance by other incompatible land uses such as recreational and residential development
- prime agricultural land is a finite resource.

REFERENCE - April Workshop

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**Wildlife (2 points)**

**EQUIPMENT**

Using the field guide provided, identify the two (2) bird species in the water.  
(2 points - 1 point each)

<hr/> 2
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Sample A: \_\_\_\_\_

Sample B: \_\_\_\_\_

ANSWER

Sample A - Northern Pintail (1 point)

Sample B - American Wigeon (1 point)

REFERENCE - Common knowledge for using field guides

**Theme (2 points)**

I) What does UTM stand for? (1 point)

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II) Your GPS unit gives you the coordinates 14 0457632 5567897. How many kilometres are you from the equator? (1 point)

ANSWER

I) Universal Transverse Mercator (1 point)

II) 5567 or 5568 (rounding) kilometres (1 point)

REFERENCE - April Work shop

**STOP 2**

**Aquatics (2 points)**

Over the past few decades, wild sport fish populations in many regions have been exposed to increased angling pressures, often resulting in significant declines in these populations. List two (2) technological "advancements" that have

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contributed to this recent increase in angling pressure on fish populations.  
(2 points - 1 each)

ANSWER

2 of the following: (2 points - 1 each)

- improved electronic fish finders,
- increased use of ATVs and other off road vehicles to access remote lakes,
- use of GPS to pinpoint prime fishing locations,
- use of more sophisticated angling gear

REFERENCE: CD/Web: Sustaining Aquatic Ecosystems in Boreal Regions

## **Forestry (2 points)**

Based on the fact that you are in a public area used for recreation, provide one (1) recreational reason the flagged tree at this stop should be removed. Provide one (1) recreational reason it should not be removed. (2 points - 1 each)

— 2
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ANSWER

1 of the following: should be removed (2 points - 1 each)

- danger to public users if diseased or broken
- aesthetics
- landscaping
- damaged by use of the area

1 of the following: should not be removed

- wildlife tree, snag
- aesthetics
- maintain shoreline stabilization

REFERENCE - binder attachment: Low impact recreational use

## **Soils (10 points)**

### **EQUIPMENT**

I) Name two (2) of the three (3) master horizons found in soil. (1 point - 0.5 each)

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II) True or false. Circle the best answer. (0.5 point)

Every soil profile has a B horizon.

0.5

TRUE

FALSE

III) Refer to your answer in II. Why or why not? (0.5 point)

0.5

IV) What is the thickness and the color of the Ah horizon? (2 points - 1 each)

**Stop 2 - Soils (10 points) continued**

2

V) Using the Canadian System of Soil Classification (CSC) provided, what is the soil order? (2 points)

2

VI) A soil pedologist has used the soil horizon suffix 'e' on his/her report. What does this mean? (1 point)

1

VII) Similarly, what does the 't' as a soil suffix indicate? (1 point)

1

VIII) Fill in the blanks. (2 points - 1 each)

\_\_\_\_\_ soils occur under poorly drained conditions.

2

\_\_\_\_\_ are gray and reddish spots indicative of alternating wetting and drying conditions.

ANSWER

I) 2 of the following: A, B, C

(1 point - 0.5 each)

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- II) False (0.5 point)
- III) Soil may not have sufficiently developed to have a B horizon. (0.5 point)
- IV) TBD \_\_\_\_\_ (2 points)
- V) TBD \_\_\_\_\_ (2 points)
- VI) eluviated (leached) horizon of clay, iron, aluminum, organic matter(1 point)
- VII) illuvial horizon enriched with clay at least 5 cm thick (1 point)
- VIII) Gleysolic; Mottles (2 points - 1 each)

REFERENCE I) to V) soils binder, p 5 (1 point), VIII) April Workshop  
VI)And VII) Soil Management Guide - p 14 or CSSC, p 15

**Wildlife (2 points)**  
**EQUIPMENT**

- I) Provide the common name of this mounted wildlife species. (0.5 point)
- II) Name three (3) habitats this animal prefers. (1.5 points - 0.5 each)

_____ 2
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**ANSWER**

- I) Coyote (0.5 point)
- II) 3 of the following: (1.5 point - 0.5 each)
  - open or semi-wooded habitats
  - aspen parkland and short- and mixed-grass prairie
  - marginal farmland
  - highly developed mixed farming areas
  - swamplands
  - game preserves
  - parks
  - the edge of cities and towns
  - near forest edges

REFERENCE - Fubearers of Canada PDF, page 7 and 8

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## Theme (2 points)

### **EQUIPMENT**

You are fishing by the marina for northern pike with a conservation licence. Use the Angler's Guide to determine the size and number of fish you can keep.

<hr/> 2
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### ANSWER

4 - Northern Pikes, but only one can be larger than 75 cm (2 points - 1 each)

REFERENCE - 2008 Manitoba Anglers' Guide

## **STOP 3**

### Aquatics (2 points)

The Winnipeg River flows from Lake of the Woods into Lake Winnipeg. List two (2) invasive animal species (common or scientific name) that we might expect to find in the Winnipeg River, either at the present time or in the very near future.  
(2 points - 1 each)

<hr/> 2
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### ANSWER

2 of the following acceptable answers: (2 points - 1 each)

- rainbow smelt (*Osmerus mordax*),
- spiny water flea (*Bythotrephes cederstroemi*),
- rusty crayfish (*Orconectes rusticus*)

REFERENCE - CD: Aquatic Invasive Species; Keys to the Freshwater Fishes

### Forestry (2 points)

True or false. Circle the best answer. (2 points - 0.5 each)

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- 1) Approximately 1 in 25 Manitobans work directly or indirectly in the province's forest industry.

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TRUE

FALSE

II) An example of a primary forest product is furniture manufacturing.

TRUE

FALSE

III) Harvesting wood for a living is a form of direct employment in the forest industry.

TRUE

FALSE

IV) The province owns over 90 per cent of Manitoba's forested land.

TRUE

FALSE

ANSWER

I) T II) F III) T IV) T

REFERENCE - I,III) Forestry CD p6; II,IV) CD attchmnt: MB Forestry: Sustain..p2

**Soils (2 points)**

Fill in the blanks. (2 points - 1 each)

Luvisolic soils are formed under \_\_\_\_\_ vegetation and at \_\_\_\_\_ elevations.

ANSWER

Forested, higher

(2 points - 1 each)

REFERENCE - Soils binder, page 35

**Stop 3 - continued**

**Wildlife (2 points)**

**EQUIPMENT**

2
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2
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Using the samples displayed at this site, list four (4) physical adaptations aquatic or shoreland birds have for survival. (2 points - 0.5 each)

**ANSWER**

4 of the following (2 points - 0.5 each)

- hollow Bones for flight & bouyancy
- oily coating on feathers for water proofing
- webbed feet for swimming
- long legs for wading
- web-less feet for digging and scratching up food
- bill (beak) for stabbing/piercing, filtering, picking of food

REFERENCE - April workshop; Hinterland Who's Who Fact Sheet on Shorebirds

**Theme (10 points)**  
**EQUIPMENT**

Using the supplied GPS, input the following coordinates:

15 0294814 5558801

_____ 10
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With this information and the map provided, determine the following from your current position by the flag:

I) Determine the distance from your current position to the inputed coordinates. (4 points) \_\_\_\_\_  
4

II) Determine the bearing from your current position to the inputed coordinates (4 points) \_\_\_\_\_  
4

_____ 2
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III) Use the map provided at this stop to determine the name of the island at these coordinates. (2 points)

ANSWER

Distance: TBD \_\_\_\_\_

Bearing: TBD \_\_\_\_\_

5 points for within 10 metres

5 points within 5 degrees

4 points within 50 metres

4 points within 10 degrees

3 points within 100 metres

3 points within 15 degrees

2 points within 200 metres

2 points within 20 degrees

1 point within 500 metres

1 point within 30 degrees

REFERENCE - April Work shop, Garmin GPSMAP 60CSx quick start guide

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**STOP 4**

Aquatics (2 points)

**EQUIPMENT**

2

- I) The bank at this stop is slumping. List three (3) steps you can take to restore it to a healthy, stable shoreline. (1.5 points - 0.5 each)
  
  
  
  
  
  
  
  
  
  
- II) Under what circumstances is it recommended that you seek advice from the Department of Fisheries and Oceans (DFO) for your shoreline stabilization work? (0.5 point)

**ANSWER**

- I) acceptable answers (1.5 - 0.5 each)
  - 1. Regrade the slope to a gentle 25 degrees
  - 2. line with geotextile filter cloth
  - 3. plant a buffer of native shrubs and grasses
  
- II) Anytime it is adjacent to or in water (proposed work has potential to "harmfully alter, disrupt or destroy" fish habitat) and the activity doesn't comply with a DFO operational statement. (0.5 point)

REFERENCE - April Workshop on Riparian Areas: The Shore Primer - Prairies Edition pages 12 -21; [http://www.dfo-mpo.gc.ca/regions/central/pub/shore-rivages-pr/page12-21\\_e.htm](http://www.dfo-mpo.gc.ca/regions/central/pub/shore-rivages-pr/page12-21_e.htm)

Forestry (10 points)

**EQUIPMENT**

10

- I) Using the *Native Trees of Manitoba* provided at this stop, please identify the marked samples using their Scientific names: (6 points - as indicated)

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Sample A) \_\_\_\_\_ (2 points)

Sample B) \_\_\_\_\_ (1 points)

Sample C) \_\_\_\_\_ (2 points)

Sample D) \_\_\_\_\_ (1 points)

II) What is a common name given to the samples with blue flagging tape?  
(1 point)

\_\_\_\_\_  
6

\_\_\_\_\_  
1

III) What do these samples indicate about the health of the tree they are growing on? (2 points)

\_\_\_\_\_  
2

**Stop 4 - Forestry (10 points) continued**

IV) Why is the occurrence of forest fire important to some coniferous species in Manitoba? (1 point)

\_\_\_\_\_  
1

**ANSWER**

I) Sample A) ironwood (2 points)  
Sample B) TBD? Conifer (1 point)  
Sample C) white birch - winter twig (2 points)  
Sample D) poplar (1 point)

II) conks

III) Disease, deterioration, or dead

IV) Extreme heat is needed to open the cones of jack pine in order to spread seed and propagate.

**REFERENCE**

I) April Workshop, "Native Trees of Manitoba"  
II, III) Manitoba's Forests page 12

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- V) <http://www.cbc.ca/news/background/forcesofnature/forestfires.html> and [http://fire.cfs.nrcan.gc.ca/faq\\_fire\\_e.php](http://fire.cfs.nrcan.gc.ca/faq_fire_e.php) and Forestry Binder (page 9)

**Soils (2 points)**

- I) If you encounter a soil with prismatic columnar structure, what is it indicative of? (1 point)
- II) If you encounter a soil with a well developed structure, what would it look like? (1 point)

— 2
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ANSWER

- I) significant amounts of sodium in the subsoil (1 point)
- II) Well developed structure occurs when individual soil particles are aggregated they form relatively stable structures. If individual aggregates are distinct and clearly separated from one another the soil is said to have well developed structure. (1 point)

REFERENCE - Manitoba Soil Management Guide, pp 9-10

**Wildlife (2 points)**

**EQUIPMENT**

The diagram at this stop illustrates a process that is harmful to wildlife.

- I) Name the process. (1 point)
- II) What does the letter 'A' point to? (1 point)

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ANSWER

- I) Fragmentation of habitat (1 point)
- II) Anthropogenic Habitat or Human Dominated Ecosystems or anything that implies human created and dominated landscapes (1 point)

REFERENCE - April workshop

**Theme (2 points)**

- I) What type of park is the Duck Mountain Provincial Park classified as? (1 point)
- II) How many land use categories are used in the Duck Mountain Provincial Park? (1 point)

2
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ANSWER

- I) Natural park (1 point)
- II) 4 - backcountry, recreational development, resource management and access (1 point)

REFERENCE - Duck Mountain Management Plan pages 5-7

**STOP 5**

**Aquatics (10 points)**

**EQUIPMENT**

10
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Most of the water flowing in the Winnipeg River comes from lakes and watersheds on the Precambrian Shield of northwestern Ontario and southeastern Manitoba. This region is known for extensive areas of thin soils and exposed, granitic bedrock. Many lakes in the Shield are quite deep with relatively clear, cold water.

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- I) What can we conclude about the typical nutrient availability and productivity in these clear water lakes? (1 point) \_\_\_\_\_
  
- II) List the three (3) most important plant nutrients in aquatic ecosystems. (1.5 points - 0.5 each) \_\_\_\_\_  
1.5
  
- III) Circle the nutrient above that will be limiting the algal productivity in most of these cold water Shield lakes. (0.5 point) \_\_\_\_\_  
0.5
  
- IV) Photos of three (3) different algae are displayed. Circle the name (below) of the displayed alga that would most typically be found in these Shield lakes: (1 point) \_\_\_\_\_  
1
  
- Dinobryon sp. (Chrysophyte)
- Anabaena sp. (Cyanophyte)
- Oscillatoria sp. (Cyanophyte)
  
- V) In what kind of lakes might the other two (2) algae typically be important? (1 point) \_\_\_\_\_  
1
  
- VI) Under what conditions might these other two (2) algae become important in Shield lakes? (1 point) \_\_\_\_\_  
1

**Stop 5 - Aquatics (10 points) continued**

- VII) Photos of three (3) fish species are displayed at this stop. Circle the name (below) of the fish species that would most typically be found in clear, cold water, Shield lakes. (1 point) \_\_\_\_\_  
1
  
- Walleye (Sander vitreus)
  
- Lake trout (Salvelinus namaycush)

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Channel Catfish (*Ictalurus punctatus*)

VIII) What should anglers fishing in these Shield lakes know about the fish productivity? (2 points)

\_\_\_\_\_

2

IX) Why is this important for fish populations in such lakes? (1 point)

\_\_\_\_\_

1

ANSWER

I) Nutrient availability and productivity of these lakes is relatively poor or low. (1 point)

II) carbon, nitrogen, and phosphorus. (1.5 points - 0.5 each)

III) Phosphorus (0.5 point)

IV) Dinobryon, a chrysophyte alga (1 point)

V) nutrient (particularly phosphorus) rich waters, such as prairie lakes and ponds. (1 point)

VI) These other algae could occur in Shield lakes when human activities introduce excess phosphorus. (1 point)

VII) Lake trout (*Salvelinus namaycush*) (1 point)

VIII) Fish in these lakes grow and reproduce slowly because food supply is limited. (2 points)

IX) Overharvesting can result in loss of fish populations. (1 point)

REFERENCE - Aquatics workshop material on freshwater productivity and fish; Aquatics CD: Fish Species, Aquatic Food Chains and Food Webs; The Phosphorus Cycle, The Carbon Cycle, The Nitrogen Cycle, Sustaining Aquatic Ecosystems in Boreal Regions

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**Forestry (2 points)**

**EQUIPMENT**

— 2
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Refer to the photo of a penny provided at this stop.

It has recently been suggested that we remove the Canadian penny from Canadian currency. One forestry argument to support this proposal might be because a maple characteristic is incorrectly shown on the penny.

- I) Circle the maple characteristic that is wrong in this picture. (1 point)
- II) Label the maple characteristic that is wrong in this picture. (1 point)



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**ANSWER**

Circle stem

(1 point)

Maples have opposite branching, while shown on the penny as alternate (1 point)

REFERENCE - Field Guide - Native Trees of Manitoba

**Stop 5 - continued**

**Soils (2 points)**

— 2
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There are some things cottage owners can do to help prevent erosion, such as replanting vegetation, or leaving driftwood along the shore. Unfortunately, some soils are more prone to erosion, and this needs to be recognized to plan the best options. Provide two (2) soil factors which determine the erodibility by water. (2 points - 1 each)

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ANSWER

2 of the following (2 points - 1 each)

- soil texture (percent sand, silt and clay)
- organic matter content (manure content is not an acceptable answer)
- size, shape or stability of aggregates (more and larger aggregates means less erosion potential)
- permeability (less infiltration may mean more runoff)
- structure (single grained is more susceptible than cloddy structure)
- slope length and steepness

REFERENCE - Soil Management Guide, Chapter 7, pg 83

**Wildlife (2 points)**

**EQUIPMENT**

- I) Using the *Animal Tracks of Manitoba* book provided at this stop, name the wildlife species that left these tracks. (1 point)
- II) In the north, hibernation is the most dramatic form of torpidity. Name the term used for the kind of torpidity found in very hot and dry conditions. (1 point)

2
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ANSWER

- I) Black bear (1 point)
- II) Estivation (1 point)

REFERENCE - I) Identifying and Preserving Wildlife Tracks PDF  
II) Animal Adaptations, page 33

**Theme (2 points)**

Name the first four (4) Manitoba provincial parks established in 1961.  
(2 points - 0.5 each)

2
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ANSWER

Grand Beach, Duck Mountain, Turtle Mountain, Whiteshell (2 points - 0.5 each)

REFERENCE -April Work shop, Manitoba Provincial Parks - handout page 2

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## **STOP 6**

### Aquatics (2 points)

Climatic warming is expected to reduce the available habitat for cold water, stenothermic species, particularly in lakes of the Boreal Shield, such as many of those draining into the Winnipeg River. List two (2) of the species expected to be at risk of disappearing in many of these cold water lakes because of global warming. (2 points - 1 each)

2

ANSWER

2 of the following:

(1 point - 0.5 each)

- lake trout (*Salvelinus namaycush*),
- lake whitefish (*Coregonus clupeaformis*),
- opossum shrimp (*Mysis relicta*),
- cisco (*Coregonus artedii*),
- Diporeia

REFERENCE - CD/Web: Sustaining Aquatic Ecosystems in Boreal Regions;  
Fish Species - Coldwater Species

### Forestry (2 points)

Why are Pre-Harvest surveys performed in Manitoba?

2

ANSWER

Identifies values in an attempt to mitigate impacts of forest management activities on sensitive sites, waterways, wetlands, wildlife and their habitat and conserve biodiversity. (2 points)

REFERENCE - PHSurveys \MC Forest Practices Website.

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**Soils (2 points)**

Lichens can be found on the surface of the large boulder outcrop along the shoreline at this stop.

_____ 2
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- I) How would lichens be classified as a soil forming factor? (1 point)
  
- II) What role do these lichens play in soil formation? (1 point)

**ANSWER**

- I) Organisms, such as lichens, are one of the soil forming factors. (1 point)
  
- II) Lichens exude compounds which begins to break down the parent material. Over time, the resulting soil further develops as a result of accumulating organic matter and eroded parent material. (2 points)

REFERENCE - Soil Management Guide, pp 6-7; Camp Morton Workshop

**Stop 6 - continued**

**Wildlife (10 points)**

_____ 10
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- I) Name one (1) recreational activity that has an effect on otter food (1 point), explain the effect on the otter's food (1 point), and how the effect can be lessened (1 point).

Activity:

Effect:

Effects lessened:

_____ 3
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II) Four (4) mammal species are listed under the Manitoba Endangered Species Act as extirpated.

a) Name two (2) of these mammal species. (1 point - 0.5 each)

\_\_\_\_\_

1

b) Define extirpated. (2 points)

\_\_\_\_\_

2

III) Name the provincially Endangered bird that is nicknamed "the butcher bird."  
(1 point)

\_\_\_\_\_

1

**Stop 6 - Wildlife (10 points) continued**

IV) Our Grassland Ecoregions of North America are disappearing at an alarming rate.

a) Circle the Ecoregion which has less than 0.5% of its original grasslands remaining. (0.5 point)

\_\_\_\_\_

0.5

Short Grass Prairie

Mixed Grass Prairie

Tall Grass Prairie

b) Which large mammal was extirpated from the grassland ecoregions? (0.5 point)

\_\_\_\_\_

0.5

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c) List two (2) reasons for the disappearance of our grasslands.  
(1 point - 0.5 each)

\_\_\_\_\_

1

d) Circle the two (2) factors which led to the original development  
of North America's Grassland ecoregions. (1 point - 0.5 each)

\_\_\_\_\_

1

Precipitation amounts

Sunshine levels

Glaciation

Immigration

## ANSWER

I) See attached table (3 points)

Activity (1pt)	Effect (1pt)	Effect lessened by (1pt; anything that says "regulations" or "restrictions" on the impact)
Fishing	Removes fish from the waterbody	Have fishing quotas or restrictions
Cottaging	Sewage dumping causes algae bloom that kills fish	Have regulations on removal of sewage from cottages
Cottaging	Toxic waste poisons or kills fish (otter is slowly poisoned by toxins in fish or has less food)	Have strict laws on dumping toxins into water
Trapping	Removes otters from environment	Control number of trappers OR number of otters that can be taken

II) A) 2 of the following: (1 point - 0.5 each)

- Grizzly bear, Muskox, Pronghorn or Swift fox

B) A species that no longer exists in the wild in Manitoba, but occurs elsewhere either in captivity or in the wild. (2 points)

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- III) Loggerhead Shrike (1 point)
  
- IV) A) Tall Grass Prairie (0.5 point)  
B) bison (will accept Plains Grizzly Bear, Plains Wolf) (0.5 point)  
C) 2 of the following: (1 point - 0.5 each)
  - agriculture,
  - settlement, and
  - development beginning with immigration in the mid 1850's.
- D) Precipitation amounts and Glaciation (1 point - 0.5 each)

REFERENCE - April workshop; Manitoba Species At Risk fact sheets PDF  
Agassiz Interpretive Trail Brochure

**Stop 6 - continued**

**Theme (2 points)**

**EQUIPMENT**

2
---

Use the rod and reels provided at this stop to answer the following questions.

- I) Circle the best answer. (0.5 point)

What kind of fishing rod is displayed at this stop?

- a) casting
  - b) spinning
  - c) fly
- 
- II) Provide one (1) feature of this rod that assisted you in making this decision. (0.5 point)
  
  - III) Aside from using to fish or to help cast better, what is the purpose of a fishing rod? (0.5 point)
  
  - IV) Circle the best answer. (0.5 point)

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Looking at the reels provided at this stop which reel would you use on this rod?

A                      B                      C

ANSWER

- I) B) spinning (0.5 point)
- II) Guides are underneath the rod (point to the ground) and go from large to small (0.5 point)
- III) Takes tension off the line. (0.5 point)
- IV) A) (0.5 point)

REFERENCE - Aquatics Workshop CD "Recreational Fishing" pages 3-7

**STOP 7**

**Aquatics (2 points)**  
**EQUIPMENT**

2
---

- I) Write the letter of the lure provided at the stop that corresponds to the names below: (1 point - 0.5 each)

spinner: \_\_\_\_\_ crankbait: \_\_\_\_\_

- II) Which lure (name or letter that corresponds to it) in the exhibit is typically used to catch rainbow trout? Why? (1 point - 0.5 each)

ANSWER

- I) Spinner: C                      Crankbait: A                      (1 point - 0.5 each)
- II) Popper (B) because it imitates a bug floating on the surface of the water and trout like to eat bugs. (1 point - 0.5 each)

REFERENCE - April Workshop Aquatics "Recreational Fishing" CD

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**Forestry (10 points)**

**EQUIPMENT**

- I) Using the equipment and volume table provided, please measure the marked trees in this plot which was last measured in 2001. Record the information gathered in the correct places on the tally sheet and perform the calculations required. (8 points)

10
----

8

Tree	2001			2008			Volume Change
	Diameter	Height	Volume	Diameter	Height	Volume	
	cm	m	m <sup>3</sup>	cm	m	m <sup>3</sup>	
<b>A</b>	30.1	10.1	0.310	(1)	(1)	(1)	(1)
<b>B</b>	21.8	15	0.271	(1)	(1)	(1)	(1)

- II) Fill in the blanks. (2 points - 1 each)

2

The tree with the largest volume increase since 2001 is \_\_\_\_\_.

The name for this type of plot, which was established to be remeasured over time is \_\_\_\_\_.

**ANSWER**

- I) TBD:

Tree	2001			2008			Volume Change
	Diameter	Height	Volume	Diameter	Height	Volume	
	cm	m	m <sup>3</sup>	cm	m	m <sup>3</sup>	
<b>A</b>	30.1	10.1	0.310	(1)	(1)	(1)	(1)
<b>B</b>	21.8	15	0.271	(1)	(1)	(1)	(1)

- II) TBD: \_\_\_\_\_; Permanent sample plot

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REFERENCE - April Workshop

**Stop 7 - continued**

**Soils (2 points)**

Name two (2) soil constituents that can affect colour within a soil profile.  
(2 points - 1 each)

— 2
--------

ANSWER

2 of the following: organic matter; iron; carbonates (2 points - 1 each)

REFERENCE - Manitoba Soil Management Guide, page 10.

**Wildlife (2 points)**

Food and shelter are two (2) basic habitat requirements for raccoons.

— 2
--------

I) Name a recreational activity that provides these requirements for raccoons.  
(1 point)

II) How are these requirements provided by the activity? (1 point - 0.5 each)

Food:

Shelter:

ANSWER

- I) Cottaging or camping (1 point)
- II) Food - waste from dumps, garbage cans, hand feeding, etc (0.5 point)  
Shelter - cabins, under decks, sheds, washrooms, electrical boxes, etc(0.5 pt)

REFERENCE - April workshop

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## Theme (2 points)

Name four (4) of the components of GIS. (2 points - 0.5 each)

<hr/> 2
---------

ANSWER

Hardware, Software, Data, Methods, People (2 points - 0.5 each)

REFERENCE - April Work shop GIS presentation and handout

## **STOP 8**

### Aquatics (2 points)

#### EQUIPMENT

Each of these pieces of equipment is used to study lake ecosystems. Beside each of the identifying letters below, briefly indicate what each device is used to study. (2 points - 1 each)

<hr/> 2
---------

A)

B)

ANSWER

- I) [Ekman dredge] is used for sampling lake/pond bottom sediments (soft mud) (1 point)
- II) [Plankton tow net] is used to sample zooplankton (microscopic, open-water invertebrates) (1 point)

REFERENCE - Aquatics workshop material on sampling

### Forestry (2 points)

<hr/> 2
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I) Circle the best answer. (0.5 point)

Approximately how many trees are planted annually in Canada?

100 million      300 million      600 million      900 million

II) Name the three (3) most important tree species in Manitoba (by volume of growing stock). (1.5 points - 0.5 each)

**ANSWER**

I) 600 million (0.5 points)

II) Black spruce, Trembling Aspen, Jack Pine (1.5 points - 0.5 each)

REFERENCE - I) Certification and Canada's forest, p 4 II) Manitoba's Forests, p 3

**Stop 8 - continued**

**Soils (10 points)**

_____
10

I) Fill in the blanks. (4 points - 1 each)

Soil fertility testing is typically conducted to a depth of \_\_\_\_\_ cm for nitrogen and a depth of \_\_\_\_\_ cm for phosphorus.

Soil particles that move by the wind by bouncing and dislodging other particles on impact is known as \_\_\_\_\_, whereas soil particles that roll or slide along the surface is known as \_\_\_\_\_

_____
4

II) True or false. Circle the best answer. (1 point)

Chemicals can be used to combat salinity.

_____
1

TRUE                      FALSE

Justify your response (1 point).

_____
1



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**Wildlife (2 points)**

I) Fill in the blank. (0.5 point)

The Mallard is a typical member of the surface-feeding group of ducks known as \_\_\_\_\_.

2
---

II) Circle the best answer. (1 point - 0.5 each)

How many times may Mallards re-nest if their nests are destroyed?

- a) 0
- b) 1-2
- c) 3-4
- d) 5-6

The Mallards feathers are all shed at once. How long will they remain flightless?

- a) 1 month
- b) 2 months
- c) 3 months
- d) 1 day

III) Name one (1) waterfowl species that commonly benefits from the addition of artificial nest boxes. (0.5 point)

**ANSWER**

- I) Dabbling (0.5 point)
- II) B) 3 to 4 times (0.5 point)
- III) C) 1 month (0.5 point)
- IV) Wood duck (0.5 point)

REFERENCE - Hinterland Who's Who Mallard Fact Sheet; general knowledge

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Stop 8 - continued

Theme (2 points)

- I) How many Provincial Parks are in Manitoba? (1 point)
- II) What is the total number of hectares protected by Provincial Parks and Park Reserves? (1 point)

—
2

ANSWER

- 1) 80 parks (1 point)
- 2) 4,663,869 hectares (1 point)

REFERENCE - April Work shop, Manitoba Provincial Parks

**STOP 9**

Aquatics (2 points)  
EQUIPMENT

—
2

- I) Identify the name of the fish ageing structure provided at this stop. (0.5 point)
- II) Which fish species is this ageing structure taken from? (0.5 point)
- III) Using the microscope and ageing structure provided at this stop, determine the age of this fish. (0.5 point)

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- IV) Circle the description that best correlates to sturgeon growth, spawning and maturity: (0.5 point)
- a) fast growing, matures early, spawns in fall
  - b) slow growing, matures at an older age, spawns in late spring/early summer
  - c) slow growing, matures at an older age, spawns in the fall

ANSWER

- I) cleithrum (0.5 point)
- II) Northern Pike (0.5 point)
- III) 10 (plus or minus 1 year, i.e. 9-11) (0.5 point)
- IV) B) slow growing, matures at an older age, spawns in the late spring / early summer (0.5 point)

REFERENCE - Workshop training

**Stop 9 - continued**

**Forestry (2 points)**

- I) Define silviculture (1 point)

2
---

- II) Circle the best answer. (0.5 point)

Clearcutting is a recognized and necessary forest management practice that is required to reproduce certain species and types of forests.

TRUE

FALSE

Approximately what percentage of Manitoba's Annual Allowable Cut is harvested annually?

- a) 25%

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- b) 45%
- c) 65%
- d) 85%

ANSWER

- I) The art and science of growing trees or cultivating a forest. (1 point)
- II) True (0.5 point)
- III) A) 25% (0.5 point)

REFERENCE

- I) Silviculture in Manitoba, Manitoba Conservation website
- II) Silviculture in Manitoba, MFA Clearcutting, also MC website
- III) Manitoba's 5 Year Report on the Status of Forestry, page 4 and Event Training

**Soils (2 points)**

Describe one (1) challenge and one (1) benefit to farming clay soils.  
(2 points - 1 each)

— 2
--------

Challenge:

Benefit:

ANSWER

- 1 of the following challenges: (1 point)
  - hold large amounts of water and can become too wet for crop growth
  - high water holding capacity makes them more challenging to work i.e. take longer to dry out and prepare for seeding in the spring
- 1 of the following benefits: (1 point)
  - high nutrient holding capacity
  - high water holding capacity means they will store more water for crops to use in periods of drought.

REFERENCE - Spring Soils Workshop 2008; Soil Management Guide p 7

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**Stop 9 – continued**

**Wildlife (2 points)**

I) What federal permit and stamp is required to hunt waterfowl in Manitoba?  
(1 point - 0.5 each)

_____
2

II) Name the type of virus that affects certain wild birds, including various species of waterfowl. (1 point)

ANSWER

I) Canada Migratory Game Bird Hunting Permit (0.5 point)  
Wildlife Habitat Conservation Stamp (0.5 point)

II) Avian Influenza (full marks) - bird flu (0.5 point) (1 point)

REFERENCE - Hunting Guide distributed at April workshop

**Theme (10 points)**

This stop is located close to a designated snowmobile trail (as indicated by the arrows).

_____
10

I) Indicate four (4) potential impacts of snowmobiling in the Pinawa region.  
(4 points - 1 each)

_____
4

II) Identify one (1) impact of ATV use for each of the following. (4 points - 1 each)

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Soil Impact: \_\_\_\_\_

Aquatic Impact: \_\_\_\_\_

Wildlife Impact: \_\_\_\_\_

Forest Impact: \_\_\_\_\_

4

## Stop 9 - Theme (10 points) continued

III) Here are some examples of back country travel. Indicate the order of the highest impact [with one (1) being the highest and four (4) the lowest] that each mode of travel has in terms of pounds per square inch of pressure (PSI). (2 points - 0.5 each)

\_\_\_\_\_ Snowmobile

\_\_\_\_\_ Man

\_\_\_\_\_ Horse

\_\_\_\_\_ All Terrain Vehicles

2

## ANSWER

I) 4 of the following (4 points - 1 each)

- positive economic impact on Pinawa's service industry
- provides easier access for predators to get to prey in deep snow
- wildlife disturbance
- conflict between other recreation users, such as cross country skiers

II) (4 points - 1 each)

- soil impact: soil compaction
- aquatic impact: riparian and stream disturbance
- wildlife impact: chasing and disturbance
- forest impact: forest fires from no spark arrestors; damaging young trees

III) (2 points - 0.5 each)

- 1 - Horse [8 PSI]
- 2 - Man [5 PSI]
- 3 - All Terrain Vehicle [1.5 PSI]
- 4 - Snowmobile [0.5 PSI]

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REFERENCE - April Workshop, Theme Soils pdf pages 22-24,

## STOP 10

### Aquatics (2 points)

As you can see by looking around, the underlying bedrock is close to the surface in the Pinawa region. Given the nature of the bedrock in this area:

— 2
--------

- I) Where would most of the groundwater be found? (1 point)
  
- II) What kind of aquifer, if any, might occur in this region? (1 point)

ANSWER

- I) Most groundwater would be in the shallow soils on top of the impervious bedrock. (1 point)
  
- II) Given the granitic bedrock, it would be a fractured aquifer. (1 point)

REFERENCE - CD/Web: The Nature of Water: Groundwater

### Forestry (2 points)

Name two (2) of the most significant introduced pests to North American forests. (2 points - 1 each)

— 2
--------

ANSWER

- 2 of the following: (2 points - 1 each)
- Gypsy moth,
  - white pine blister rust,
  - sawflyies,
  - chestnut blight.
  - dutch elm disease,
  - European elm bark beetle,
  - balsam wooly adelgid,

REFERENCE - Alien Forest Pests, NRCan

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**Soils (2 points)**

Climate change models predict an increase in soil erosion from wind and water. Provide two (2) reasons for this prediction. (2 points - 1 each)

2
---

ANSWER

2 of the following: (2 points - 1 each)

- increased drought
- increased flooding
- warmer winters and less snowcover, resulting in more soil exposure
- increased use of summerfallow due to drier soils
- increased freeze-thaw cycles in winter, causing a breakdown in soil structure
- loss of forest cover, increasing exposure of erodible soils

REFERENCE - Climate Change Impacts and Adaptation, pg 7-8

**Stop 10 - continued**

**Wildlife (10 points)**

**EQUIPMENT**

In the middle column, write the number of the picture from the species key provided at this stop that corresponds to the statement in the first column. Write the species or common name in the last column. (10 points - 0.5 each)

10
----

Statement	#	Name
This plant signifies spring in North America and is Manitoba's Floral emblem. It is usually found in the mixed-grass and tall grass prairie.		
This plant has lanced-shaped leaves that are densely covered with silky hair, giving it a silvery appearance. It is listed as a Threatened wildflower in Manitoba.		
This plant is listed provincially and nationally as Endangered. It grows in clumps and has a "pouch-like" flower.		
This bird has a prominent thick coned-shaped bill, which is remarkable for a bird of its size. It has an appetite for the forest pest, spruce budworm.		
This bird frequents open places such as fields, pastures, and dry uplands. When intruders are too close to its nest, it will perform a distraction called a broken-wing act.		
This bird nests on sandy shores of larger prairie lakes and its eggs are well camouflaged. It is provincially and nationally listed as Endangered.		

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ANSWER	TBD	(10 points – 0.5 each)	
This animal uses sticks, trees and mud to build its lodge. Its teeth are constantly growing. This animal is also the symbol for the National Parks system in Canada.			
This animal has long legs to help it move through snow and a long, dense winter coat that provides effective insulation . It is the only animal where both male and females have antlers.			
This animal is the largest land mammal in North America. It has a keen sense of smell and hearing; it can distinguish smells from 3 kilometres away.			
This animal has very large antlers that are grown new each year. It is highly vocal and uses grunts and squeals to keep in touch with each other.			
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each other.		
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REFERENCE - Mixed-Grass Prairie brochure PDF, Manitoba Species at Risk fact sheet PDF, Hinterland Who's Who fact sheets, Furbearers of Canada PDF

**Theme (2 points)**

Name the four (4) park classifications used in Manitoba's provincial park system. (2 points - 0.5 each)

<hr/> 2
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ANSWER

Wilderness; Natural; Recreation; Heritage (2 points - 0.5 each)

REFERENCE - April Work shop, Manitoba Provincial Parks - handout page 2

**STOP 11**

**Aquatics (10 points)**

**EQUIPMENT**

<hr/> 10
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I) Nitrogen occurs in water in three (3) forms. Name these three (3) forms and provide chemical formulas for each. (3 points - 0.5 each)

<hr/> 3
---------

II) Name three (3) ways that nitrogen enters the water? (1.5 points - 0.5 each)

<hr/> 1.5
-----------

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III) Looking around you, what is the one (1) site specific activity that could contribute nitrogen to the river? (0.5 point) \_\_\_\_\_  
0.5

IV) Use the instructions and the nitrate/nitrite strips provided at this stop to determine the value for: (2 points - 0.5 each) \_\_\_\_\_  
2

Nitrate Nitrogen \_\_\_\_\_  
Using the conversion factor, determine the Nitrate value: \_\_\_\_\_mg/l

Nitrite Nitrogen \_\_\_\_\_  
Using the conversion factor, determine the Nitrite value: \_\_\_\_\_mg/l

**Stop 11 - Aquatics (10 points) - continued**

V) Use the chart provided at this stop to answer the following questions. (1 point - 0.5 each) \_\_\_\_\_  
1

Does the nitrate value fall within the range found in the Winnipeg River?

YES

NO

Why do you think the nitrate values are so low in the Winnipeg River?

VI) What makes the phosphorus **cycle** unique when compared to the nitrogen and other nutrient cycles? (1 point) What are two (2) implications of its uniqueness? (1 point - 0.5 each) \_\_\_\_\_  
2

ANSWER

I) Nitrite (NO<sub>3</sub>) Nitrate (NO<sub>2</sub>) Ammonia (NH<sub>3</sub>) (3 points - 0.5 each)

II) it enters the water from human and animal waste, decomposing organic matter, and runoff of fertilizer from lawns and crops. (1.5 - 0.5 each)



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- re-planting bare ground areas with native trees and shrubs
- removing invasive species such as Common Burdock and European Buckthorn;
- creating a low-impact woodchip trail to safely guide users through the forest with little damage to the surrounding vegetation; and
- educating the public with informational signs.

## REFERENCE

- I) Low-Impact Recreational Practices for Wilderness and Backcountry, David N. Cole, Page 3
- II) The Assiniboine Park Riverbottom Forest Project website

## Stop 11 - continued

### Soils (2 points)

A producer has acquired land in a native state somewhere in agro-Manitoba. The land is broken to sow a crop. Describe how the soil organic matter content would change after 50 years of cultivation.

2

## ANSWER

- organic matter is depleted or reduced (1 point)
- tillage accelerates organic matter decomposition (1 point)

REFERENCE - Soil Management Guide, p 96

### Wildlife (2 points)

Name two (2) restrictions that have been placed on tundra buggy activities in Churchill. (2 points - 1 each)

2

## ANSWER

2 of the following: (2 points - 1 each)

- must travel during times when ground is frozen,
- must stay on existing roads when possible
- use barren beach ridges if traveling off existing roads
- if they become a hazard to people, polar bears may be put down;
- extremely tight laws are in place to prevent attracting bears to people (can also substitute "attracting... to people" with "people feeding...", "people dumping food waste..." outside bear-watching buggies).

REFERENCE - April workshop

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**Theme (2 points)**

I) Provide one (1) example of an on-water, high impact recreational activity. (0.5 point)

_____
2

II) Name three (3) possible negative effects of the above activity on fish and/or water. (1.5 points - 0.5 each)

**ANSWER**

- I) 1 of the following: (0.5 point)  
- power boating, jet skiing, water skiing (or other similar activity)
- II) 3 of the following: (1.5 points - 0.5 each)  
- noise pollution,  
- exhaust/fuel/oil pollution/discharge,  
- wave-action (soil/bank erosion),  
- increased turbidity,  
- introduction of AIS,  
- propeller can harm fish and plants

REFERENCE - Theme handout on CD, aquatics section

**STOP 12**

**Aquatics (2 points)**

**EQUIPMENT**

I) Circle the best answer. (0.5 point)

_____
2

Using the specimens or pictures provided at the stop, identify the rusty crayfish.

Specimen 1

Specimen 2

II) What are two (2) external features that helped you identify the rusty crayfish? (1 point - 0.5 each)

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III) Circle the best answer. (0.5 point)

In Manitoba, rusty crayfish have been found in:

- a) West Hawk Lake
- b) Nutimik Lake
- c) Birdtail River
- d) Falcon Lake

ANSWER

I) Picture 2 (0.5 point)

II) 2 of the following: (1 point - 0.5 each)

- dark band on tips of claws
- a circular rusty/brown spot on each side of carapace roughly where you'd put your fingers when picking it up;
- larger claws
- space between pinchers when closed.

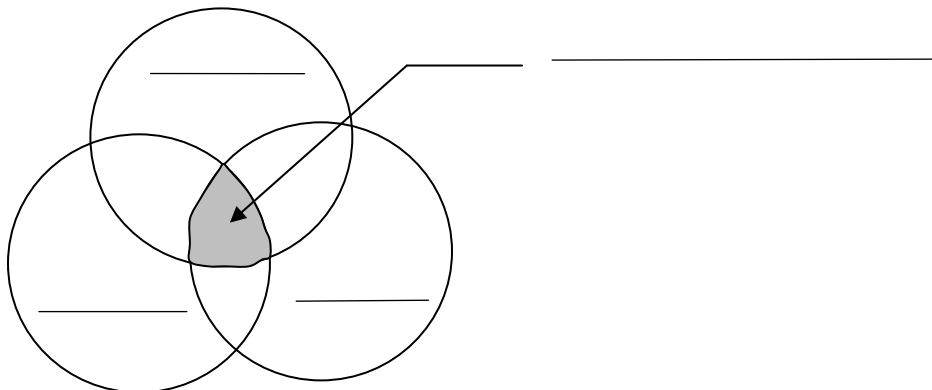
III) D) Falcon Lake (0.5 point)

REFERENCE - I) AIS in Aquatics Binder II & III) April Workshop

**Forestry (2 points)**

Label the Forest Stewardship Management diagram. (2 points - 0.5 each)

_____
2



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ANSWER

(2 point - 0.5 each)

Environmental, Economic, Social, overlap Sustainability

REFERENCE - April Workshop 2008 - Forestry Handout

## Stop 12 - continued

### Soils (2 points)

#### EQUIPMENT

Pinawa is located on the N 1/2 of 3-14-12E and S 1/2 of 10-14-12E. Using the Soil Capability for Agriculture map, locate the corresponding agriculture capability code for these areas. What percentage of each class (and subclass) of land is found within this area?

<hr/> 2
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ANSWER

90% Class 7R

(1 point)

10% Organic soils

(1 point)

REFERENCE - Soil Capability for Agriculture Map - Pointe Du Bois

### Wildlife (2 points)

I) Circle the best answer. (1 point)

Furbearer seasons are set when the pelts are at their prime. Between which months is a coyote's fur in its prime?

<hr/> 2
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a) September to October

b) November to January

c) February to March

d) April to June

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II) The Registered Trapline (RTL) System is a unique conservation method whereby a person, the "lineholder," is granted the exclusive opportunity to harvest furbearing animals in a certain area, the "RTL line." Provide one (1) reason why this system is important. (1 point)

ANSWER

I) B) November to January (1 point)

II) One of the following: (1 point)

- the system ensures sustainable furbearer populations by controlling the number of trappers in that area and making the lineholder the steward of the resource
- trapping was out of control and furbearing animal numbers had been depleted
- animals were taken without regard of seasons and populations
- local people (mostly First Nations) who had been trapping on the land for generations saw their traditional livelihoods threatened

REFERENCE - Trapping Guide distributed at April workshop

**Stop 12 - continued**

**Theme (10 points)**

Identify five (5) environmental impacts caused by recreational activities that are visible at this site (5 points - 1 each) and indicate why they are considered environmental impacts (5 points - 1 each).

10
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ANSWER

Some possible answers (require 5 activities and 5 reasons for full marks)

- Break in wildlife corridor
- Imported material (sand) impacting shoreline
- Run-off from parking lot impacting water quality
- Golf course runoff impacting water quality
- Riparian area disturbed

REFERENCE - April Work shop, theme cd, handouts, etc.

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**STOP 13**

**Aquatics (2 points)**

A few kilometres downstream from Pinawa is the Seven Sisters dam and hydroelectric generating station. This dam backs water up beyond Pinawa, making this section of the Winnipeg River a reservoir. List two (2) characteristics of this section of river that are much different because of the Seven Sisters dam.  
(2 points - 1 each)

<hr/> 2
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ANSWER

- 2 of the following (2 points - 1 each)
- deeper water
  - less sediment transport,
  - more algal photosynthesis,
  - more lake species,
  - less (slower) current,
  - more light transparency,
  - reduced fish migration,
  - fewer riverine species.

REFERENCE - Aquatics CD: Water as Environment (How Standing and Flowing Waters Differ)

**Forestry (10 points)**

**EQUIPMENT**

I) Please determine the age of the sample provided. (Use any sample and the hand lens if necessary). (4 points)

<hr/> 10
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<hr/> 4
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II) Circle the best answer. (1 point)

<hr/> 1
---------

Dendrochronology refers to:

- a) the time of year that leaves form on trees
- b) the study of plant evolution
- c) the analysis of tree growth ring patterns

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d) the difference in plant growth from one area to another

**Stop 13 - Forestry (10 points) continued**

III) Provide three (3) reasons why forests and trees are measured.  
(3 points - 1 each)

3

IV) Circle the best answer. (1 point)

Which of the following species is *not* a 'pioneer' disturbance-dependent species?

1

- a) aspen (*Populus tremuloides* Michx.)
- b) jack pine (*Pinus banksiana* Lamb.)
- c) balsam fir (*Abies balsamifera* (L.) Mill.)
- d) black spruce (*Picea mariana* (Mill.) BSP.)

V) Provide one (1) major difference between a Forest Management Plan (FMP) and an Annual Operating Plan (AOP). (1 point)

1

ANSWER

- I) TBD \_\_\_\_\_ (4 points)  
(+/- 3 years = 3 points; +/- 5 years = 2 points; +/- 10 years = 1 point)
- II) C) The analysis of tree growth ring patterns (1 point)
- III) 3 of the following: (3 points - 1 each)
  - Calculate volume/AAC
  - Calculate growth rates

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- Determine site productivity
- Determine forest health
- Predict future development

IV) C) Balsam Fir (1 point)

V) FMPs are strategic landscape level, long term plans  
AOPs are operational detailed stand level plans approved annually  
(1 point - 0.5 point each)

REFERENCE - April Workshop, MFA\_clearcutting

**Soils (2 points)**

**EQUIPMENT**

2
---

I) In the area marked 'A', what is the size of the parcel marked on the ortho photo provided (use metric or imperial units)? (1 point)

II) What is the dominant vegetative cover in the area marked 'B'? (1 point)

**ANSWER**

I) TBD \_\_\_\_\_ (1 point)

II) TBD \_\_\_\_\_ (1 point)

REFERENCE - April Workshop

**Stop 13 - continued**

**Wildlife (2 points)**

**EQUIPMENT**

2
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I) What term is used to describe the food habits of this skull? (1 point)

II) How can you tell? (1 point)

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ANSWER

- I) TBD \_\_\_\_\_ (1 point)
- II) TBD \_\_\_\_\_ (1 point)

REFERENCE - Skulls in Education, page 39 and April workshop

**Theme (2 points)**

- I) What are two (2) negative effects caused by wave action? (1 point - 0.5 each)
- II) Name one (1) thing that can be done to reduce the impacts of wave action. (1 point)

_____
2

ANSWER

- I) 2 of the following (1 point – 0.5 each)
  - bank/soil/shoreline erosion, uprooting shoreline plants
- II) 1 of the following (1 point)
  - speed limits for boats,
  - increase distance between boats and shoreline

REFERENCE - Theme Handout on CD - aquatics section

**STOP 14**

**Aquatics (2 points)**

Name four (4) functions of a healthy riparian area. (2 points - 0.5 each)

_____
2

ANSWER

- Four of the following: (2 points – 0.5 each)
- trap sediment
  - build and maintain streambanks
  - recharge groundwater
  - filter and buffer water
  - reduce and dissipate stream energy
  - maintain biodiversity
  - create primary production

REFERENCE - aquatics CD - Managing the Water's Edge

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**Forestry (2 points)**

<hr/> 2
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- I) What tree species at this site could be used in the construction of a canoe?  
(1 point)
  
- II) Why is there a difference in the amount of Carbon sequestered by an "average" tree in an urban environment versus a rural environment? (1 point)

ANSWER

- I) White Birch (1 point)
  
- II) In the urban environment, it is assumed that the annual litter (leaf) fall from the tree is removed, so no carbon is added to the soil. In the rural and afforestation areas, litter is not removed, so we can assume a typical added component of carbon stored in the soil. (1 point)

REFERENCE - April workshop and "What Trees can do to Reduce Atmospheric CO2" - page 8

**Stop 14 - continued**

**Soils (10 points)**

Percent soil porosity = [ 1- (bulk density/particle density)] x 100

Particle Density = 2.65g/cm<sup>3</sup>

Bulk Density of Coarse Sand = 1.81      Bulk Density of a Clay Loam = 1.25

<hr/> 10
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- I) Calculate the percent porosity for each of the soil textures. Show your work.  
(6 points)

<hr/> 6
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- II) Compare and explain the difference in the speed of water movement between the two (2) soil textures. (2 points)

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- III) Fill in the blanks. (2 points - 1 each)

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\_\_\_\_\_ is the rate of water entry into the soil;

whereas \_\_\_\_\_ is the rate of water movement through the soil.

ANSWER

- I) % Porosity for coarse sand =  $[1 - (1.81/2.65)] \times 100$  (1 point)  
Clay Loam =  $[1 - (1.25/2.65)] \times 100$  (1 point)  
= 32% (+/- 1%) = 52% (+/- 1%) (4 points - 2 each)
- II) Water flows through a coarse sand faster because the pores are larger and more continuous than in a clay loam soil, and because clay particles hold water more tightly [with electrical charges]. (2 points)
- III) **Infiltration**                      **Hydraulic Conductivity**                      (2 points - 1 each)

REFERENCE - Pages 41-43: Soil Management guide; Water Use and Moisture Management chapter

**Stop 14 - continued**

**Wildlife (2 points)**  
**EQUIPMENT**

_____
2

Refer to the photos of Manitoba Orchids at this stop.

- I) Circle the best answer. (0.5 point)
- What type of soil conditions are required to support native Manitoba Orchids? (0.5 point)
- a) sandy
  - b) moist and nutrient rich
  - c) well-drained and nutrient rich
  - d) none of the above
- II) What helps native Orchids draw up nutrients out of the soil into the plant? (0.5 point)

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- III) Name one (1) factor that has contributed to listing Manitoba's Orchids as a Species at Risk. (0.5 point)
- IV) Name one (1) vector used to pollinate Orchids. (0.5 point)

ANSWER

- I) B) moist and nutrient rich (0.5 point)
- II) a fungus (0.5 point)
- III) One of the following: (0.5 point)
  - Changes to their habitat through drainage of wetlands,
  - harvesting,
  - reduction in pollinators,
  - removal of habitat.
- IV) Insects (bees, flies, beetles etc) **not** wind. (0.5 point)

REFERENCE -Agassiz Interpretive Trail brochure and PDF, and April workshop

**Theme (2 points)**  
**EQUIPMENT**

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Of the following two (2) types of docks which has fewer impacts on aquatic resources (1 point) and why (1 point)?

- Dock 1) the pipe dock seen at this stop
- Dock 2) a crib/concrete dock seen in the photo provided at this stop

ANSWER

Dock 1) seen at this stop, has fewer impacts on natural resources (1 point) because it does not cover or remove sensitive and important shore habitat (littoral zone - aquatic vegetation, rocks, logs, etc.) that provides spawning nursery, fringe habitat. (1 point)

REFERENCE - Theme Hanout on CD - Aquatics Section

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**STOP 15**

Aquatics (2 points)  
EQUIPMENT

<hr/> 2
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Using the fish and equipment provided at this stop answer the following:

INDICATE WHICH TABLE YOU ARE MEASURING AT:    A        B

- I)    Determine the fork length of the fish in millimeters. (0.5 point)
  
- II)   Determine the weight of the fish in grams. (0.5 point)
  
- III) Use the photo of the inside of your fish provided at this stop and circle the best answer. (0.5 point)

What is the sex of this walleye?

male

female

- IV) Using the above information and the graph provided at this stop, determine the age of this walleye if it was sampled in 2007. (0.5 point)

ANSWER

- I)    TBD - \_\_\_\_\_ (0.5 point)
  
- II)   TBD - \_\_\_\_\_ (0.5 point)
  
- III) TBD - male or female (0.5 point)
  
- IV) TBD - \_\_\_\_\_ (0.5 point)

REFERENCE -April Workshop

Forestry (2 points)

- I)    What is a forest stakeholder? (0.5 point)

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II) List three (3) examples of forest stakeholders. (1.5 points - 0.5 each)

ANSWER

- I) A forest stakeholder is a individual or group of people that has a vested interest in how the forest is managed for different forest values. (0.5 points)
- II) 3 of the following: (1.5 point - 0.5 each)
- Fisher
  - First Nations
  - local communities
  - Canoeists, motor boaters
  - Outfitters
  - berry pickers
  - Naturists, Environmental groups
  - Snowmobile clubs/ groups, ATV groups
  - Trappers
  - photographers

REFERENCE - Forestry handout - Envirothon Workshop April 18, 2008 - page 7

**Stop 15 - continued**

**Soils (2 points)**

I) Fill in the blank. (1 point)

Agricultural soils in Manitoba have an inherently \_\_\_\_\_ pH.

II) How does adding nitrogen fertilizer affect soil pH? (1 point)

ANSWER

- I) alkaline OR neutral OR high (1 point)
- II) Lowers or depresses soil pH (increases soil acidity) because as nitrogen fertilizers are broken down in the soil, hydrogen is released into the soil solution. (1 point)

REFERENCE - Soil Management Guide, p 12; Soils Binder, p 30

**Wildlife (2 points)**

**EQUIPMENT**

Using the animal scat key provided, identify the two (2) scat samples. (2 points - 1 point each)

2
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2
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Sample A - \_\_\_\_\_

Sample B - \_\_\_\_\_

ANSWER

Sample A - TBD \_\_\_\_\_ (1 point)

Sample B - TBD \_\_\_\_\_ (1 point)

REFERENCE - Common knowledge for using keys

**Theme (10 points)**

- I) The Leave No Trace Principles of outdoor ethics form the framework of Leave No Trace's message. What are the seven (7) principles of outdoor ethics?  
(7 points - 1 each)

_____
10

**Stop 15 - Theme (10 points) continued**

- II) Describe four (4) methods to reduce the impact of camp fires.  
(2 points - 0.5 each)

_____
7

- III) Circle the best answer. (1 point - 0.5 each)

_____
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How deep should a "cathole" be?

- a) 15-20 cm
- b) 40-45 cm
- c) 45-70 cm
- d) 70-75 cm

_____
1

How far should a "cathole" be from water?

- a) 6 meters

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- b) 16 meters
- c) 60 meters
- d) 100 meters

## ANSWER

I) 7 points - 1 point each

1. Plan Ahead and Prepare
2. Travel and Camp on Durable Surfaces
3. Dispose of Waste Properly
4. Leave What You Find
5. Minimize Campfire Impacts
6. Respect Wildlife
7. Be Considerate of Other Visitors

II) 4 of the following:

(2 points - 0.5 each)

- Use a lightweight stove for cooking, enjoy a candle lantern for light.
- Where fires are permitted, use established fire rings, fire pans or mound fires.
- Keep fires small. Only use sticks from the ground that can be broken by hand.
- Burn all wood and coal to ash, put out campfires completely, then scatter cool ashes.
- Avoid burning personal garbage, food and toilet paper.

III) (1 point - 0.5 each)

- A) 15 - 20 cm
- C) 60 metres

REFERENCE - April Work shop, Forestry material (16-LeaveNoTrace.pdf page 1)

## STOP 16

### Aquatics (2 points)

#### EQUIPMENT

Use the fish identification key to provide the species or common name of the fish at this stop. (2 points - 1 each)

2

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Fish A) \_\_\_\_\_

Fish B) \_\_\_\_\_

**ANSWER**

Fish A: TBD \_\_\_\_\_

Fish B: TBD \_\_\_\_\_

REFERENCE -Aquatics CD - Fish Keys and Fish Species information

**Forestry (2 points)**

I) What is Forest Certification? (0.5 point)

II) What are the three (3) forest Certification systems currently in use in North America? (1.5 points - 0.5 each)

_____
2

**ANSWER**

I) Forest Certification is primarily about providing objective evidence of sustainable forest management. People around the world want to be assured that products they buy are not harming the environment. Forest Certification is one way that forest companies can publicly demonstrate that forest management practices maintain the health of the forest as well as the stability and livelihoods of local communities. (0.5 points)

II) The three forest certifications systems are: (1.5 points - 0.5 each)  
1. Canadian Standards Association (CSA)  
2. Sustainable Forestry Initiative (SFI)  
3. Forest Stewardship Council (FSC)

REFERENCE - Forestry Binder - page 18  
- Forestry handout - Envirothon Workshop April 18, 2008 - page 37

**Soils (2 points)**

_____
2

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I) Detailed soil survey maps are much more accurate and reliable for making decisions at the \_\_\_\_\_ level. (1 point)

II) Circle the best answer. (1 point)

Of the following map scales, which would be the most detailed?

- a) 1:1,000,000
- b) 1:125,000
- c) 1:50,000
- d) 1:20,000

ANSWER

I) On-farm or municipal decision level

II) D) 1:20,000

REFERENCE - Source: Soil Management Guide, Page 24.

**Stop 16 - continued**

**Wildlife (10 points)**

**EQUIPMENT**

Manitoba has a wide variety of wildlife species. Some have wandered by and left their tracks. Please identify the tracks you see here, using the Animal Tracks of Manitoba: (10 points - 1 point each)

_____ 10
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- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_

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- f) \_\_\_\_\_
- g) \_\_\_\_\_
- h) \_\_\_\_\_
- i) \_\_\_\_\_
- j) \_\_\_\_\_

ANSWER (10 points - 1 each)

- |                      |                     |
|----------------------|---------------------|
| a) Beaver            | f) Moose            |
| b) Black Bear        | g) Great Blue Heron |
| c) Red Fox           | h) Mallard          |
| d) Muskrat           | i) Canada Goose     |
| e) White-tailed Deer | j) Mink             |

REFERENCE - Identifying and Preserving Wildlife Tracks PDF

**Theme (2 points)**

The following is a list of features that you could record using GPS. Indicate with a checkmark in the appropriate box if the feature is a point, line or area.  
(2 points - 0.5 each)

2
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Feature	POINT	LINE	AREA
a geocache			
path taken by a Snow Goose fitted with a satellite transmitter			
boundaries of a provincial park			
extent of algae bloom on Lake Winnipeg			

ANSWER (2 points - 0.5 each)

Feature	POINT	LINE	AREA
a geocache	<b>X</b>		
path taken by a Snow Goose fitted with a satellite transmitter		<b>X</b>	
boundaries of a provincial park			<b>X</b>
extent of algae bloom on Lake Winnipeg			<b>X</b>

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REFERENCE - April Workshop presentation - Model Forests, MF network websites

## STOP 17

### Aquatics (10 points) EQUIPMENT

As a fisheries biologist in the Northwest region you have been monitoring the lake trout populations in Clearwater Lake through an annual index netting survey for the past 10 years. This lake experiences heavy recreational fishing pressure. After stakeholder consultation with industry and public you know the management objective for this lake is to maintain a healthy population of lake trout and ensure that adequate numbers of large fish are available for the lodge industry. You know that lake trout are long living and extremely slow growing so it takes years for one to become a "trophy size" fish (minimum length 89 cm/35 in). You also know that maturity, abundance, age-frequency data is used to make fisheries management decisions. Use this information and the graphs provided at the stop to answer the following questions.

10

I) Use Figure 1 provided at this stop to answer the following questions:  
(2 points - 1 each)

2

a. At age does lake trout growth start to level out?

b. Circle the best answer.

Compared to Prosperous Lake, lake trout growth in Reed Lake  
is:

FASTER

SLOWER

II) Use Table 1 provided at this stop to answer the following questions:  
(2 points - 1 each)

2

a. Circle the best answer.

[ Male / Female ] lake trout mature at an earlier age

which is usually [ 3 / 6 / 9 / 12 ] years.

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b. Of the fish sampled, how many are in the 'trophy' size length range?

**Stop 17 - Aquatics (10 points) continued**

III) Use the age-frequency distribution shown in Figure 3 to answer the following questions: \_\_\_\_\_

3

a. Circle the best answer. (1 point - 0.5 each)

The lake trout population is:

INCREASING      STEADY      DECREASING

The figure illustrates a distribution skewed to the:

LEFT                      RIGHT

b. Above what age are lake trout poorly represented? (1 point)

IV) Given the above information what two (2) regulations can you implement to meet the management objectives for Clearwater Lake? (2 points - 1 each) \_\_\_\_\_

2

V) What type of fishery are many lakes in northern Manitoba managed as? Hint: this has become a marketing tool used by lodge operators. (1 point) \_\_\_\_\_

1

**ANSWER**

- I) 8 (1 point)
- II) males ; 6 (2 points - 1 each)
- III) decreasing (1 point)
- IV) a) 12.6;      b) left;                      c) 22 (3 points - 1 each)
- V) a reduction in limit and a maximum size limit (2 points - 1 each)  
(no keeping fish over 35 in/89 cm or limiting number that can be kept).
- VI) High Quality Management Lakes (1 point)

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REFERENCE - April Workshop material "Fish Community Assessment and Recreational Fishing"

## Forestry (2 points)

What are the four (4) Biomes or Ecoregions of Manitoba? (2 points - 0.5 each)

<hr/> 2
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ANSWER (2 points - 0.5 each)

1. Tundra
2. Boreal Forest
3. Temperate Deciduous Forest (also accept Broadleaf/ Mixed wood Forest or Aspen parkland)
4. Grassland (also accept small Broadleaf Forest Stands)

REFERENCE - Sustainable Forest Ecosystems - A Senior 2 Science Unit - page 21  
Manitoba Conservation Forestry Branch web site - Introducing Manitoba Forest's

## Stop 17 - continued

### Soils (2 points)

#### EQUIPMENT

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Use the textural triangle provided at this stop to answer the following questions.  
(2 points - 1 point each)

I) Circle the correct answer.

When describing soil texture, what is the size of the sand fraction?

2.0 - 0.05 mm      0.05 - 0.002mm      less than 0.002 mm

II) A soil contains 30% Clay and 40% Sand. What is the texture of the soil?

ANSWER

I) 2.0 - 0.05mm (1 point)

II) Clay Loam (1 point)

REFERENCE - I) Soil Management Guide p.7 II) B. Soils CD, textural triangle p.23

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**Wildlife (2 points)**

**EQUIPMENT**

2
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- I) In the pictures provided, which of the three (3) flowering plants is listed as Endangered in Manitoba? (1 point)
- II) What is the name of this Endangered plant? (1 point)

ANSWER

- I) B (1 point)
- II) Western Prairie Fringed-Orchid (1 point)

REFERENCE - April Workshop and Manitoba Species at Risk fact sheets PDF

**Theme (2 points)**

**EQUIPMENT**

2
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Use the GPS unit to determine the UTM of the flagged post at this site.

ANSWER

TBD: \_\_\_\_\_

REFERENCE - April Workshop - GPS training

**STOP 18**

**Aquatics (2 points)**

**EQUIPMENT**

2
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Use the chart provided at this stop to answer the following:

- I) How many times did the average E. coli density of Patricia Beach (Lake Winnipeg) exceed the Recreational Water Quality Guideline? (0.5 point)
- II) The most common form of fecal bacteria is Escherichia coli (E. coli). Where do E. coli and other fecal coliforms originate? (0.5 point)
- III) List two (2) typical symptoms associated with E. coli. (1 point - 0.5 each)

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ANSWER

- I) Four (4) times (0.5 point)
- II) Digestive tract of warm blooded animals (0.5 point)
- III) 2 of the following: (1 point - 0.5 each)
  - mild fever, vomiting, diarrhea, stomach cramps

REFERENCE: Theme CD - Aquatics section

**Forestry (2 points)**

2
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- I) Why are branches missing from the flagged trees at this stop? (1 point)
- II) Why are there "cages" at the base of the marked trees? (1 point)

ANSWER

- I) Browsed by beavers (1 point)
- II) to prevent beavers from eating them (1 point)

REFERENCE

- I) common knowledge, wildlife training
- II) Applied knowledge, Wildlife Binder (page 13, 39, & 75)

**Stop 18 - continued**

**Soils (10 points)**

10
----

- I) Match the each term below to its definition. (5 points - 1 each)
  - a) gravimetric moisture content
  - b) plastic limit
  - c) field capacity
  - d) permanent wilting point
  - e) soil porosity

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- f) bulk density
- g) texture
- h) soil series
- i) root channel saturation

\_\_\_\_\_ Measurement made by determining the oven-dry mass of soil per unit volume: expressed as g/cubic cm.

\_\_\_\_\_  $[(\text{weight of wet soil} - \text{weight of dry soil}) \times 100] / \text{weight of dry soil}$

\_\_\_\_\_ Maximum amount of water held in a soil measured after it is saturated and allowed to drain freely. \_\_\_\_\_

5

\_\_\_\_\_ Soil water content at which water is no longer available to plants.

\_\_\_\_\_ Percentage of a given volume of soil that is made up of air spaces.

II) Match the following deposition terms to the correct definitions below.  
(5 points - 1 each)

\_\_\_\_\_ Lake deposited, usually well sorted

a) till

\_\_\_\_\_ Wind deposited

b) lacustrine

\_\_\_\_\_ Glacier deposited material

c) outwash

\_\_\_\_\_ Accumulation of dead vegetation in poorly drained areas

d) fluvial

\_\_\_\_\_ River or stream deposited

e) eolian

f) organic deposits

5

ANSWERS

I) f, a, c, d, e

(5 points - 1 each)

II) b, e, a, f, d

(5 points - 1 each)

REFERENCE

Source: Water Use and Moisture Management

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<http://www.gov.mb.ca/agriculture/soilwater/soil/fbe01s04.html>  
Source: Understanding the Soil Landscapes in Manitoba  
<http://www.gov.mb.ca/agriculture/soilwater/soil/fbe01s02.html>

## Stop 18 - continued

### Wildlife (2 points)

How does horseback riding in the back-country spread non-native plant species?  
Provide two (2) examples. (2 points - 1 each)

— 2
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ANSWER

seeds in horse droppings and feed brought along for food (2 points - 1 each)

REFERENCE - April workshop

### Theme (2 points)

What is the purpose of the Backcountry Land Use Category in the provincial park system?

— 2
--------

ANSWER

(2 points)

Protects examples of natural landscapes and provides basic facilities and trails for nature-orientated recreation in a largely undisturbed environment.

REFERENCE - April Work shop, Manitoba Provincial Parks - handout page 3

## **STOP 19**

### Aquatics (2 points)

EQUIPMENT

I) What is the common name of the benthic invertebrate that makes and lives in the casings shown at this stop? (0.5 point)

— 2
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II) Write the letter that corresponds to the casing beside its typical location below (1 point - 0.5 each)



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- I) White Spruce (*Picea glauca*) (1 point)
- II) 3 of the following: (3 points – 1 each)
- roots chewed and used to make watap, a cord used to sew together birch bark canoes
  - young trees were used to make snowshoes and bows
  - bark used to make cooking pots and trays for gathering berries
  - boughs were used for bedding and temporary shelter
  - rotten wood for smoking moose hides.
  - resin was worked into the seams to waterproof canoes
  - resin chewed as a natural chewing gum.
  - pitch was heated and used as glue to fasten skins onto bows and arrowhead onto shafts
  - pitch as poultice for a variety of skin irritations
  - resin, watery sap and teas of boiled needles and twigs contain Vitamin C and other nutrients used for treating tuberculosis, scurvy and coughs
- III) Traditional Ecological Knowledge (1 point)
- IV) "aboriginal" or "indigenous" or "First Nations" (1 point)
- V) Non-Timber Forest Products (1 point)
- I) 3 of the following (see above list as well): (3 points – 1 each)
- edible berries
  - wild mushrooms
  - medicinal plants
  - maple products
  - Christmas trees, etc

REFERENCE - all parts covered at workshop day

I & II) <http://www.gov.mb.ca/conservation/forestry/forest-education/pt-contents.html>

III) & IV) envirothon workshop material discussed, and [modelforest.net/cmfn/en](http://modelforest.net/cmfn/en)

V) Binder attachment: Forestry Stats and Trends, and [www.nfdc.ca/about.htm](http://www.nfdc.ca/about.htm)

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**Soils (2 points)**

**EQUIPMENT**

Using the sample provided and the Soil Texture By Feel Guide, list the texture of the sample.

_____
2

**ANSWER**

TBD \_\_\_\_\_

(2 points)

REFERENCE - Spring Soils Workshop 2008

**Wildlife (2 points)**

Name four (4) adaptations seen in plants at this stop that helps them survive in harsh growing conditions. (2 points - 0.5 each)

_____
2

**ANSWER**

4 of the following:

(2 points - 0.5 each)

- some plants are short, low growing to maximize heat & to keep out of the strong winds
- waxy coating on leaves & stem to contain moisture
- thorns and spines to reduce grazing from animals
- seed dispersion by wind
- shallow root system for growing on rocks and shallow soil
- require minimal water
- some plants may grow taller, but will have nodes or 'joints' along the stem to allow the bending and flexing in the winds.

REFERENCE - April Workshop

**Theme (2 points)**

Use the Manitoba Hunting Guide provided at this stop to answer the following:

- I) What are the dates of the rifle deer hunting season near Brandon, Manitoba?  
(1 point)

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II) How many snow geese can a hunter have in his/her possession? (1 point)

ANSWER

I) Nov 12 - Dec 2                      II) 80                                      (2 points - 1 each)

REFERENCE - Hunting guide pages 21&42

**STOP 20**

2
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**Aquatics (2 points)**

**EQUIPMENT**

I) Finally the weather is warming up in northern Manitoba and the ice is coming off the lakes. You're all geared up to go fishing in Athapapuskow Lake in the Northwest Division, but can't remember when the season opens. Using the 2008 Anglers' Guide provided at this stop, state when the season opens. (0.5 point)

II) You're out on the water now and are hoping to catch the "big one". Use the equipment provided at this stop to hook a fish. You're allowed three casts and awarded 0.5 point for each time your cast is successful (i.e. gets inside the mouth of the fish). **The stop attendant will register your catches below and initial.** Good Luck! (1.5 points - 0.5 each)

- a)    yes    or    no
- b)    yes    or    no
- c)    yes    or    no

Attendant's Initial: \_\_\_\_\_

ANSWER

I) May 17                      II) TBD - casting

REFERENCE - April Workshop - fishing demo

**Forestry (2 points)**

2
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On frequently-used designated campsites, loss of vegetation cover and soil disturbance are inevitable. Please list two (2) major reasons for the impacts on vegetation and soil. (2 points - 1 each)

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**ANSWER**

the disturbed (compacted) area becomes extremely large,  
trees are damaged unnecessarily,  
campfire impacts are widespread  
widespread erosion occurs

REFERENCE - Low-Impact Recreational Practices for Wilderness and Backcountry,  
David N. Cole, Page 6

**Soils (2 points)**

Fill in the blanks. (2 points - 1 each)

2
---

- I) The bacteria which are able to form nitrogen fixing nodules with legume roots are the \_\_\_\_\_ genera.
- II) The fungus-root associations which contribute to plant functioning of 95% of vascular plants are known as \_\_\_\_\_.

**ANSWER**

I) Rhizobium                      II) Mycorrhizae                      (2 points - 1 each)

REFERENCE - Microbiology; pgs 655-656

**Stop 20 - continued**

**Wildlife (10 points)**

Human actions that can lead to the extinction of species in the wild can be grouped into five categories with the acronym HIPPO. In the "Category" column, write the category that corresponds to each letter. (5 points - 1 each)

In the "Recreational Activity" column, provide an example of a recreational activity within each category that has the potential to harm wildlife (2.5 points - 0.5 each). In the "Explain" Column, explain the potential harm of the recreational activity to wildlife. (2.5 points - 0.5 each)

10
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	Category	Recreational Activity	Explain
H			

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I			
P			
P			
O			

ANSWER (5 points)                      (2.5 points - 0.5 each)                      (2.5 points - 0.5 each)

	Category	Recreational Activity	Harm
H	Habitat loss/fragmentation	Back country trail (ski, hike, etc.) Recreational development (cottages, ski, etc.)	Fragments habitat  Destroys habitat
I	Invasive species	Trail use Cottaging	Transport seeds Planting invasive species
P	Pollution	Fishing or Any activity that leaves behind toxic chemicals	Lead sinkers Oil, gas spills, exhaust
P	People	Urbanization or pop. growth Human footprint More people in back country	Destroy habitat Using resources Fragment habitat
O	Overexploitation/harvest	<i>Unregulated</i> (key word) hunting, fishing, trapping	Decline in wildlife populations

REFERENCE - April workshop

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**Theme (2 points)**  
**EQUIPMENT**

As a trapper, a friend living in the Steinbach area approached you to catch some beavers. Before you can trap them, you will need to know when the trapping season begins and ends. Use the Trapper's Guide to determine the trapping season for this region.

ANSWER - Oct 1 - May 31

(2 points)

REFERENCE - Trapper's guide page 5