



# WORKSHEET

## WHAT'S THE SCORE?



### FOREST USE

Identify how many hectares you plan for each forest use. Remember the total must equal 100 hectares.

Discuss with your team and identify how many hectares you plan for each land use.

	LAND USE (hectares)							TOTAL
	Wilderness Reserve	Cultural Sanctuary	Trails	Campground	Hunting/ Foraging	Reservoir	Timber Harvest	
Area (hectares)								100 hectares

### ENVIRONMENTAL FACTORS

#### STEP 1 – WILDLIFE CONSERVATION

Determine how this plan will affect the wildlife management indicator species. Put the number of planned hectares for each forest use from the Forest Use table in all the blank boxes below for that activity (a shaded box means that the species won't live in an area with that activity). Multiply the total hectares per species by the number of animals per hectare. (For owls and wood rats, round down to the nearest whole animal.) Compare the new population totals you get to the original population of five owls, 250 wood rats and 6000 salamanders.

	LAND USE (hectares)							TOTALS		
	Wilderness Reserve	Cultural Sanctuary	Trails	Campground	Hunting/ Foraging	Reservoir	Timber Harvest	Total Hectares Per Species	Animals Per Hectare	New Population
Owls									.05	
Wood Rats									2.5	
Salamanders									60	

Species	Old Population	New Population
Owls		
Wood Rats		
Salamanders		

## STEP 2 – FOREST COVER

Trees will need to be removed for any trails, roads, campground, or timber harvest and regeneration your plan includes. Put the number of planned hectares for each for each land use from the Forest Use table in the blank boxes below for that activity. Multiply the total hectares for each land use by the number of Trees Removed Per Hectare to get the Trees Removed for each use. Sum up the total trees removed. There are initially 37,000 trees in Hundred Hectare Wood: Calculate how many trees will remain with your plan.

	FOREST USE							TOTAL	
	Wildlife	Timber	Trails	Campground	Hunting/ Foraging	Reservoir	Cultural Sanctuary	Trees Removed	Trees Remaining
Area (hectares)									
Trees Removed per Hectare	0	40	10	20	10	150	0		
Total Trees Removed									
Total Trees Remaining Per Plan									

## SOCIAL FACTORS

### STEP 3 – NUMBER OF VISITORS

Calculate the number of visitors your plan will attract to the forest each year. Multiply the number of hectares for each land use (above) by the numbers below. Then, sum the totals.

	LAND USE (hectares)							TOTAL VISITORS PER YEAR
	Wilderness Reserve	Cultural Site	Trails	Campground	Hunting/ Foraging	Reservoir	Timber Harvest	
Visitors per Hectare	12	0	62	124	3	150	12	
Visitors per Plan								
Area of Use								

## STEP 4 – CULTURAL SITE PROTECTION

Calculate how well your plan safeguards the cultural site. For each land use in your plan, measure on your map the nearest distance (in m) to the cultural site, and place that distance in the table below. Assign points based on the distance from the site, with 1 point for each 100 m in distance. Wilderness and Sacred Lands are 10 points each as they do not impact the site. The final score is the lowest of the points that isn't 0.

	FOREST USE							TOTAL
	Wilderness Reserve	Cultural Site	Trails	Campground	Hunting/ Foraging	Reservoir	Timber Harvest	
Area (hectares)								
Distance (in m)								—
Points	10						10	

## ECONOMIC FACTORS

### STEP 5 – COST AND REVENUE: FOR DEVELOPMENT

Calculate the net cost of developing the site for your plan. Add the numbers from the Forest Use table to the second row, Area of Use. To determine the construction cost, multiply the number of hectares for each land use from the Forest Use table, by the dollar amounts below, and then sum the total. To calculate the revenue, multiply the number of trees removed for each land use (from Step 2 above – note that some numbers may need to be added together) by \$50 per tree, and then sum the total. Subtract the total revenue from the total construction cost to determine the net cost. (If the number is positive, it is a cost; if it is negative, it is revenue.)

		FOREST USE (hectares)							TOTALS
		Wilderness Reserve	Cultural Sanctuary	Trails	Campground	Hunting/ Foraging	Reservoir	Timber Harvest	
Costs	Construction Cost per Hectare			\$3,000	\$15,000	\$5,000	\$40,000	\$5,000	
	Area of Use								
	Total Construction Cost								
Revenue	Trees Removed								
	Revenue: Sale of Trees (\$50 per Tree)								
Net Cost	Net Cost (Total Construction Cost Minus Income)								

## STEP 6 – COST AND REVENUE: EACH YEAR

Calculate the annual management cost for your plan. Add the numbers from the Designated Land Use to the Area of Use in the table below. To calculate the management costs, multiply the management costs per hectare by the number of hectares for each land use, and then sum the totals. To determine the income from fees, multiply the fees per visitor by the number of visitors for your plan (from Step 3), and then sum the totals. Subtract the Total Revenues from the Total Management Costs to determine the annual cost or revenue. (If the number is positive, it is a cost; if it is negative, it is revenue.)

		LAND USE (hectares)							TOTALS
		Wilderness Reserve	Cultural Sanctuary	Trails	Campground	Hunting/ Foraging	Reservoir	Timber Harvest	
Costs	Management Costs per Hectare	\$10	\$10	\$50	\$240	\$20	\$50	\$100	
	Area of Use								
	Total Management Costs								
Revenue	Revenues: Fees per Visitor	\$2	\$0	\$2	\$20	\$15	\$15	\$2	
	Total Visitors								
	Total Revenues								
Net Cost	Net Cost or Revenue (Management Costs minus Revenue)								

Look at the numbers in each step of your plan. What did your plan achieve? Did it offer many visitors an opportunity to enjoy the forest? Have you protected the cultural space? Were the wildlife species impacted? Did you turn a profit, or did this plan cost you?



# LEARNING ACTIVITY



## STEM SKILLS

Collaboration, Data Analysis, Investigation, Technology Use

## MATERIALS

Copies of worksheets (see Getting Ready); area map showing potential study sites (optional); two images of a forest area (see Getting Ready); flag markers; clipboards, tape measures; string; coloured chalk; compasses; tree identification guides (optional); transparency film; spades or trowels, plus paper cups or small plastic bags; tablespoons; distilled water; eyedroppers; Petri dishes or plastic containers; pH paper (with range of at least 5–10); printer paper or other white paper; binoculars or magnifying glasses (optional)

## TIME

### PREPARATION

60 minutes

### ACTIVITY

One 50-minute session, plus approximately 90 minutes (or more)

## 3. MONITORING FOREST HEALTH

Through a variety of health indicators, learners assess the health of a forested area, and see how soil scientists, wildlife biologists, arborists, and other forest professionals monitor forests.

### LEARNING OBJECTIVES

- Conduct a forest health inventory of a local wooded area.
- Analyze data to determine forest health.
- Experience first-hand some procedures forest professionals use to monitor forest health.

### LINKING TO LIFE

- Learners identify different jobs and tools involved in monitoring trees and forests.

### BACKGROUND

Forest health describes the resiliency, productivity, and sustainability of forest ecosystems. The health of the forest is one indicator that foresters use to assess the forest's condition and to develop options for managing the forest.

A forest is a complex system with many interdependent elements, including plant and animal species, soil and water, and cycles and processes. When it is functioning well, this system supports a diversity of species, helps to store and filter water, improves air quality, stores carbon, and performs other vital ecosystem services. Since it would be impossible to measure each individual component, forest health monitoring focuses instead on specific indicators of forest health, such as tree and crown condition, forest diversity, and presence of wildlife.

Many people in many different roles can be involved in assessing forest health. For example, a wildlife biologist might determine the animal species supported by the forest ecosystem, a tree physiologist may assess the health of individual trees, an Indigenous traditional knowledge holder may offer valuable observations on recent and historical changes to the forest's composition, a statistician may collect and help interpret forest data, and a geographer may map the assessment results. Together, this information helps forest managers determine the best courses of action for a given forest.

# FOREST