

MAKING DECISIONS IN THE FOREST

OVERVIEW

There are no easy solutions to the problems which emerge in protecting natural areas. Solving them requires that the parties affected participate and compromise in the decisions made. The students will analyze the problems that the MONARCH BUTTERFLY SPECIAL BIOSPHERE RESERVE in Mexico faces, and will propose solutions.

BACKGROUND

Over the years, the final destination of the great majority of migrating Monarch butterfly's was a true mystery, especially for zoologist Fred Urquhart, a professor at the University of Toronto, Canada. Since 1937, he has studied this singular insect. His main objective was to determine the route followed by the butterfly during its migration and the Monarch's overwintering site. To that end, it was necessary to know the distance traveled, the direction and the destination of the flight. It took Dr. Urquhart a long time to figure out a way to obtain this data. He solved the problem by marking the butterflies with a small adhesive tag, which he designed. The tag was affixed by gently applying pressure to the butterfly's wing, and did not affect its flying capability. It is important to note the effort involved in capturing these delicate insects, and subsequently, releasing them without any harm.

In 1952, the first marking of the Monarchs was completed. The tags had an identification number and the inscription "send to Zoology Dept., University of Toronto, Canada". With the collaboration of numerous residents from Canada and United States, it was determined that the butterflies flew on a diagonal route, crossing the US from the northeast to

LEVELS

Grades 5–12

SUBJECTS

Primary: Social Studies, Natural Sciences and Language Arts.

Middle School: Social Studies, Language Arts, Journalism

High School: Socioeconomic Problems, Reading and Writing Workshop

CONCEPTS

- Forests, as well as other ecosystems, contain numerous habitats that support diverse populations of organisms.
- Human societies and cultures throughout the world interact with each other and affect the natural systems upon which they depend.
- In democratic societies citizens have a voice in shaping resource and environmental management policies. They also share in the responsibility of conserving resources and behaving in an environmentally responsible manner.

SKILLS

Analysis, Synthesis, Oral and Written Communication, Information Gathering, Planning, Teamwork, Critical Thinking, Problem Solving.

OBJECTIVES

The students will analyze the problem areas concerning the care of Monarch sanctuaries and will propose alternative solutions..

MATERIAL

Set of cards explaining dilemmas, writing paper to write proposals.

TIME REQUIRED

Preparation: As needed.
Activity: 45 minutes

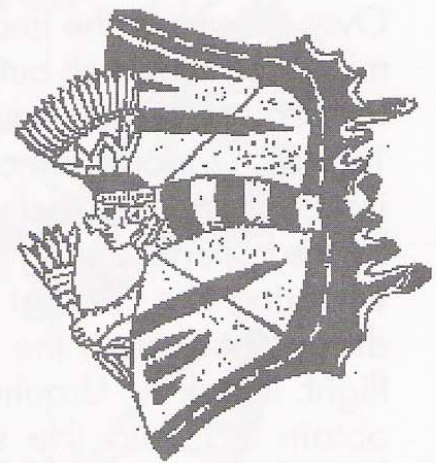
ACTIVITIES

1. Ask your students to research in the public library how butterflies were used in pre-hispanic cultures or use the background information for this activity. Make a list on the board of all the ways butterflies were used in pre-hispanic culture, for example: on ceremonial altars to burn aromatic plants and incense, as ornaments on nose rings, headdresses, etc., and, in architecture on murals, columns, etc., and any other uses such as religious, as myths or legends.

2. Discuss why the butterfly's figure was used. Because of its beauty and coloring? Because of a particular meaning? Let the students give their opinions freely.

3. Subsequently, the students should research how the butterfly's figure is used today and particularly, that of the Monarch Butterfly. Have the students bring objects from home in which the butterfly's figure is represented. Classify the objects by usage. Discuss if the uses have changed and how.

4. Use the attached sheet which has the designs of the pre-hispanic butterfly to make crafts. For example, use them to create a fabric stamped with its design, an embroidery, a wood engraving, other wooden articles, cards, etc. Set up an exhibit with the objects created.



Xochiquetzal

ADDITIONAL ACTIVITIES

1. Ask the students if they know any myths or legends about butterflies. Ask them to tell the story to their classmates and discuss the possible origin of that myth or legend. If the subject of "the butterfly of death or bad luck" is discussed, make it clear that these are superstitions and that no butterfly can be a carrier of sickness or a messenger of death.

2. Write a story or legend about the migration of the Monarch Butterfly. Select the best and send them to PROFAUNA A.C. for publication in the next report.

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the southeast. It was observed that large groups of butterflies crossed Texas apparently in route to Mexico.

In 1972 several Mexican newspapers published an announcement, asking for volunteers to locate the hibernation sites. A Mexican-American couple, living in Mexico, solved the enigma. Based on the information from some woodcutters of a small town called Angangueo, they located the first colony in a fir forest (oyamel) in the Michoacán mountains, in 1975.

Dr. Urquhart was notified and visited the site in 1976. He was there for several days, marking butterflies. Some of these marked samples were found north of Texas, in April of the same year. In this way, the migratory route of the Monarch Butterfly was established. But, new questions arose. Why did they choose this area? What characteristics make it special?

Located in the high mountains of the neovolcanic axis of México, this temperate forest is humid with an abundance of pines, firs and cedars. The great number of trees ensures that the temperature and humidity remain steady in the forest, creating the essential conditions for the Monarch's survival.

At the end of autumn, when the Monarch Butterflies arrive at their sanctuaries, they form groups which roam the higher mountain elevations, changing places every night. As winter advances and the temperature goes down, these lepidoptera move to the lower elevations until they find the right altitude, where the temperature and humidity stay at the required level for hibernation. By mid December, they gather, forming large and dense clusters that hang from the trees and, transform the landscape into a handsome tapestry of orange tones. There they remain in hibernation until mid February.

The importance of this forest is that the trees are not only useful to support the butterflies' colonies, but they also provide the ideal micro-climate for hibernation (from 6 to 15° C) as a result of the forest's density. In these forest conditions, the butterflies avoid extreme cold temperatures which would

freeze them to death, and high temperatures which would trigger their activity, forcing them to burn the fat stored for mating and returning north in the spring.

Although variations in temperature could be accounted for by natural causes, they are, as a rule, the result of deforestation. Mortality studies on Monarchs indicate that when tree density is less than 400 trees per hectare, the internal temperature surpasses the critical threshold for the butterflies' survival, freezing hundreds of thousands of butterflies to death.

To avoid this situation and protect the Monarch butterfly's overwintering sites, on October 9, 1986, a Presidential Decree was issued. It declared 16,110 hectares of woodland a Natural Protected Area, classifying it as a Special Biosphere Reserve and turning six nucleus zones into sanctuaries where no exploitation of any kind is allowed. These zones include the following areas: the Cerro Altamirano and the Cerro Pelon in the state of México; and the Sierra El Campanario, the Sierra Chincua, the Cerro Chivati and the Cerro Huacal in the state of Michoacán, each surrounded by a buffer zone or area where harvesting of trees and tourism are permitted but on a limited basis.

A large area of the reserve is occupied by farming communities called "ejidos" where living conditions are poor, particularly in health, education, communication, housing and drinking water. For many years, lumbering has been their principal means of livelihood with agriculture, cattle raising and mining as secondary economic activities.

However, economic need has led the inhabitants of this region to overexploit their natural resources. Deforestation caused by excessive felling of trees, whether for the timber industry, for farming, or for cattle raising, has contributed to the destruction of the forest's natural vegetation and, as consequence, to the impoverishment of the inhabitants and the deterioration of the Monarchs' overwintering sites. In the opinion of many researchers, the real danger which threatens the butterflies are these changes in land use.

In an attempt to halt the deforestation caused by the local inhabitants, who are pressed by economic need, various projects have been initiated over the last few years, including an ecotourism project which opened one of the sanctuaries to the public. In theory, the profit made was to be divided among the local residents. The neighboring communities also were to benefit from the tourism, by making food, lodging and transportation available, and by selling their crafts.

However, the local participants in the project complained that their per capita income was still too low and that it did not meet their needs. As a result, the felling of trees continues at an alarming rate.

To further complicate matters, the behavior of tourists exacerbates the problem. Many do not obey the rules established to protect the Monarchs in their sanctuary. They smoke, their noise disrupts the butterflies' peaceful hibernation, they disturb the butterflies by shaking the branches where the butterflies cluster, and even catch the butterflies for their personal collections. They litter a great deal, and start bonfires which in some cases have resulted in larger fires, another factor contributing to the destruction of the Monarch Butterfly's habitat. Many conservation groups have voiced their concern because of the high rate of fires in the reserve. Some have suggested closing the sites to tourists.

Under these circumstances it is necessary for the people of these communities to find new, alternate ways of sustainable development. The Mexican Government, the U.S. Fish & Wildlife Service and some non-governmental organizations are helping the communities diversify their activities. In addition to tourism, local communities have been encouraged to become involved in soil conservation, horticulture, fruit growing, fish breeding, carpentry, and reforestation to improve the quality of life without affecting the forests they inhabit. As with every official project aiming at helping the communities, this one has faced difficulties; mainly, because it is not simple to change the peasants' customs and practices. It is also not easy to eliminate the corruption that prevails at all levels.



On the other hand, until the peasants benefit economically in a significant way, and become environmentally conscious of their relationship to nature, the pines, firs, and cedars will continue to be harvested indiscriminately. It is also evident that in order to protect the Monarch Butterfly and other species, it is not enough to declare a zone a "protected area." It is essential to consider the needs of the human groups that live in or near the area.

Mexicans face the challenge and the responsibility to ensure that each citizen is able to satisfy his or her most basic needs. Only then will we be able to guarantee not only the protection of the Monarch Butterfly, but also the protection of other species that inhabit our country.

ACTIVITIES

1. Discuss the following dilemma with your students:

The overwintering sites of the Monarch Butterfly are located in 16,110 hectares of temperate and humid forest with a predominance of pines and Douglas fir. The area includes the municipalities (similar to the US counties) of Ocampo, Angangueo, Zitacuaro, Hidalgo and Contepec in the state of Michoacan and Donato Guerra, Villa de Allende, and Temascalcingo in the State of Mexico.

Many communities are located in the Reserve. The living conditions are extremely poor in the majority of them. The people mostly practice subsistence agriculture but some raise cattle as well. They only plant corn and beans needed for family use. But, in order to farm, they must cut down the trees. And, because the forest soil is quickly depleted of its low level of nutrients (3-4 years), they frequently clear new land for cultivation. In order for the animals to graze, the people frequently burn the dry and tough grass to allow the growth of green and tender grass. But sometimes the fire gets out of control, causing forest fires. At the same time, the indiscriminate pasturing of the animals destroys the new trees, making it difficult for the forest to recover. The people in the community also supplement their small incomes by commer-

cial harvesting of trees, either on their own or as employees of lumber dealers.

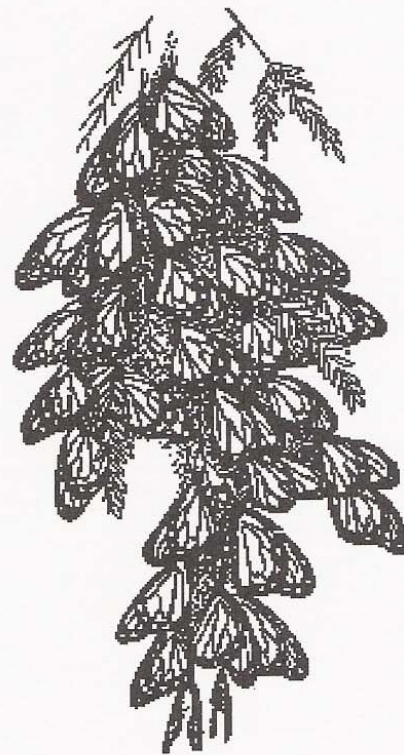
Agriculture, cattle raising, the harvesting of trees, and other factors such as fires, and plant diseases and pests combined contribute to the destruction of the Monarch's winter habitat and could put the species' survival at risk. This situation worries several conservation groups who demand an end to the harvesting of trees, attempt to regulate agricultural and cattle raising practices and try to prohibit tourists from entering the sanctuary, because the visitors do not obey the rules.

The communities oppose those measures. Meanwhile, entrepreneurs and lumber dealers put pressure on the Government to get permits for tree harvesting, claiming to contribute to the creation of new jobs and profits for the region. Governmental organizations in charge of the Reserve, face a big dilemma because they know that if they stop the clearing and harvesting of trees and tourism, the economic problems would get worse, not only in El Rosario, but in the entire region as well.

The situation is critical because all groups wish to impose their view. The Mexican Government must decide what is best for the butterfly, the community members, and the region. To that end, the Government has gathered all the people interested and each group may present their point of view and possible solutions to the problem.

2. Ask the group to select six students to play the role of Government authorities (such as the U.S. Forest Service or the U.S. Fish & Wildlife Service) and a representative of the different mayors of the region. They will represent the Board of Directors, whose functions will be to listen to the groups, analyze the proposals, make a decision, and communicate it to the others.

3. Depending on the group size, divide the students into teams to represent: community members of El Rosario, neighboring communities, a Conservation Group, lumber dealers



and public opinion. Once each team has chosen their role, they must prepare their presentation. Each group will have five minutes to present and two to answer questions.

Also, name two reporters, one from the press and another from radio or TV. The reporters must cover the debate, conduct interviews, prepare a newspaper article, and a news program. You can play the moderator role, or assign a student to that role.

4. Once the debate is finished and the Board of Directors has given their verdict, ask the students to explain why they reached such a decision and if they consider it beneficial to the butterfly, the people from El Rosario, and the region in general. Otherwise, who does it benefit? What does the group think? Who is right?

Emphasize to your students that each group in the debate has a vested interest or reason for their view, and that to find a solution which satisfies everyone is almost impossible. It is not easy to solve the problems related to conservation. For that reason, it is necessary that each interested party compromise or yield to some of the demands made by opposing groups, even when their interests are affected.

5. Ask the students the following:

Do they think that there is any action they can take in their community that might help halt the cutting down of trees in the Monarch Butterfly Special Biosphere Reserve? Would decreasing their paper consumption have an effect? Yes or no? Why?

ADDITIONAL ACTIVITIES

1. Ask the students to investigate if there is a similar situation in their community that is affecting a particular species. If so, have them do the research and prepare their own presentation.

2. Write a letter to the Mexican Secretaria del Medio Ambiente, Recursos Naturales y Pesca (the Department of the Environment, Natural Resources and Fishing), to express your concern about the future of the overwintering sites. The address is:

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