



CONSERVATION EDUCATION PROGRAM *Learning on the Land*

October 2010

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San Juan Mountains Association—For Lands' Sake!

Welcome to our e-Newsletter!

We hope you enjoy SJMA's newsletter created solely for educators - whether you teach in the classroom or outdoors, this newsletter is for you! In each monthly issue, you will receive helpful information on natural and cultural resources found in the Four Corners area, as well as field and classroom activities to do with your students.

The San Juan Mountains Association is the educational nonprofit partner for San Juan National Forest and Bureau of Land Management. If you received this newsletter and do not wish to continue receiving it, send an "unsubscribe teacher newsletter" email to gabi@sjma.org. If a friend or colleague sees this newsletter and is interested in receiving it, please have them send an email to gabi@sjma.org.

Life Zones

What is a life zone?

In nature, certain things live in certain places. In many cases, a large number of plants and animals live together in a specific **ecosystem** and **biome** combined to make a **life zone**. **Biomes** are climatically and geographically defined as similar climatic conditions on earth. **Ecosystems** are biological environments consisting of all the organisms living in a particular area (as well as non-living). Within a life zone, plants and animals live with a certain dependence upon each other that only exists within that zone.

Life zones are determined by some main characteristics: 1) moisture content or humidity of the area, and 2) elevation or latitude. Some animals can move from zone to zone. This is often because of a seasonal migration. Some specific plants are only found within a specific zone. Other times, plants may overlap a couple zones.

Elevation and Latitude

Elevation and latitude can have the same effect on life zones. As latitude increases, climates become colder. The same goes for elevation. As elevation increases, climates become colder.

This is the most obvious when considering tree lines; the elevations at which trees no longer grow due to harsh conditions. In Colorado, approximately 38° north latitude, tree line can be found around 11,500 – 12,000 feet. In New York State, approximately 44° north latitude, tree line is around 4,500 – 4,800 feet. Even farther north up into the Arctic Circle, tree line is eventually at sea level.

North and south facing slopes

The elevation at which a life zone changes will vary subtly according to exposure. If a slope is north facing – meaning less exposure to the sun – plants will not survive at as high of an elevation. In contrast, if a slope is south facing with more exposure to the sun, plants can survive at a higher elevation. However, with a south-facing slope, plants cannot survive at a lower elevation due to the intensity of the sun and less moisture. It is possible to stand in a valley and clearly observe one life zone on the south facing slope and another life zone on the north facing slope.

Moisture Content

Humidity and precipitation have a huge effect on a life zone. In Colorado, the mountainous landscape dictates humidity and precipitation. The lowest elevations are the driest. Moisture increases with elevation until the Sub-Alpine zone. Above that, moisture will decrease with elevation gain due to a lack of plants to help hold the moisture in the soil.

The aridity at lower elevations is due in part to the intensity of the sun. However, the main factor is that the warm, dry air rises up to the mountains to an elevation where it becomes cool enough to condense. Then the precipitation will generally fall on that higher elevation, most commonly the Sub-Alpine and Alpine Tundra life zones.

Western Colorado's Life Zones

The composition and climate of life zones vary across the world because of the factors mentioned above. To get an idea of how life zones vary, even in just a small area, here is some information about the life zones of Western Colorado, near Durango.

- **Riparian Zones – All elevations**

Life zones near water are known as **riparian zones**. Riparian zones can be found at any elevation. The zones are characterized by their proximity to water – be it a river, lake or marsh. Riparian zones make up narrow bands of ecosystem that would not be possible without the water.

Plant life abounds in this water rich zone. You will also see more animals in a riparian zone than anywhere else. This is especially true for birds. The abundance of plant life provides food and habitat for the animals. Even if the animals don't live right near the water, they will come to drink.

Plants that are found in the riparian zone include: Colorado blue spruce, water birch, river alder, wild mint and cottonwood trees.

Animals that live here include: beavers, dippers (water ouzel), and salamanders.

Semi-desert Shrublands - Approximately 5,000 - 7,000 feet

This is the driest of all the Western Colorado life zones. Although it is very dry, there is an abundance of life in this zone. The plants and animals found in the Semi-desert Shrublands are not usually associated with Colorado and its Rocky Mountain identity. The trees are merely shrubs, not growing much taller than 10 feet. These include: pinyon pine, and Rocky Mountain juniper. Smaller shrubs, 5 feet or shorter, include: big sagebrush, rabbitbrush and bitterbrush. Prickly pear, claret cup and Cholla cacti also live here.

The animals here are very well suited to this dry climate. Of course there are reptiles such as horny toads, lesser lizards and rattlesnakes. Mammals also abound. Keep your eyes peeled for kit foxes, jackrabbits, coyotes and even the occasional ringtail.

The Montane Forest - Approximately 6,500 - 9,000 feet

The Ponderosa Pine tree dominates this life zone. Ponderosas enjoy the semi-arid conditions found in this zone. Douglas and white firs can be found within the shade of the Ponderosas and on north facing slopes. Aspen trees are found here starting at about 7,500 feet and extending into the Sub-Alpine life zone. Most trees here, especially the Ponderosa pines, are spaced far apart due to a lack of ground water. Open meadows are not uncommon in this zone.

The lower, shrub layers of the Montane Forest of Colorado are a mix of scrub oak or common juniper mixed with currant bushes, serviceberry, Wood's rose and many others.

Animals that live in this life zone all the time include: pocket gophers, wild turkeys and skunks. Migrating animals include: mule deer, elk, black bears and red tailed hawks.

The Sub-Alpine Forest - Approximately 8,500 -12,000 feet

This zone is at an elevation that holds the most moisture. This is due to the effects that the high mountains have on weather, described earlier. Moisture also flows down from the Alpine Tundra. As a result, the sub-alpine elevations are greener and lusher than the Montane Forest. Common trees here include: Sub-alpine fir and Engelmann spruce. Aspen trees live here up to about 10,500 feet. Shrubs include: twinberry, pacific red elderberry, Wood's rose and wild raspberry. Animals that live in this zone year-round include: snowshoe hare, porcupines and blue grouse. Migrating animals include: Big horned sheep, mule deer, elk, and black bears. Black bears generally hibernate within the Sub-Alpine Zone.

The Alpine Tundra - Approximately 11,500 – 14,000 feet

The word "**tundra**" comes through Russian from the Kildin Sami word *túndâr* meaning "uplands," or "treeless mountain tract". It is generally used to refer to an area where the weather is so harsh that trees are unable to grow. Tundras that exist at high elevations are referred to as Alpine Tundras. The plants that grow on the tundra have **adapted** to deal with the harshness. The tundra is very windy due to the lack of trees. Therefore, all the plants are less than six inches off the ground. It is not as windy down close to the ground and the ground itself put off heat. Many plants form a dense mat of vegetation. This mat helps to trap precious heat. Plants are also coarse and pokey to discourage animals from eating them.

Animals on the tundra need to be equally hardy and well adapted. Animals have the luxury of movement that plants do not share. Therefore, many of the animals simply migrate away from the tundra when conditions become too cold. However, those that stick around benefit from some amazing adaptations.

Animals and their adaptations include:

- Pika: These rabbit like creatures have short ears, nose and tail help keep heat close to the body.
- Ptarmigan: These birds are brownish in the summer and white in the winter so they are always camouflaged from predators. This is extra important for a bird with no trees to hide in.

Migrating animals that enjoy the tundra include:
Mountain goats, big horned sheep and elk.

Staying in the zone

If you were to move a plant or animal to a drastically different life zone, thousands of miles away, two outcomes could occur. There is a good chance that the foreign plant or animal would not survive because of the unfamiliar surroundings. Or, a plant might take over and choke out a native plant thus becoming an **invasive species**.

Field & Classroom Activities

- Where are we? Head out to your school yard. Observe the plants and animals. Also, talk with others about what elevation you are at and how much it rains in the area. See if you can figure out what life zone your school is in. Then take a field trip to another zone and contrast the two.
- Biomes around the world: Try to figure out more about countries around the world. Get into groups and choose a country for your group. Then research the climate and determine which biome the country is in using the list and descriptions at <http://en.wikipedia.org/wiki/Biome>. Each group should present their findings to the class.
- Make your own life zone. Have each student choose a life zone discussed in this newsletter. Then, have them draw a picture or make a diorama and include as much different flora and fauna as possible. Pictures can also be cut out from magazines, or printed off the internet and glued onto a poster or diorama. Emphasize adding flora and fauna not mentioned in the newsletter.
- If at all possible, take a field trip to the Alpine Tundra! Be sure to tread lightly.

Extend the Experience

Alpine Tundra: Ecogeeks Episode 3 – check out this short video to see more about the alpine tundra - <http://www.youtube.com/watch?v=xAxtZBh3Zng>

Check out the **Forest Keepers booklet**, put out by SJMA and San Juan Public Lands. It has many activities to do outside, including a great picture of life zones in SW Colorado. You may get a copy from any Public Lands Office on the San Juan National Forest, or contact our Education Department about getting copies – email gabi@sjma.org or call 385-1256.

Announcements

Classroom Presentations

Teachers, looking for a way to supplement your science lessons with fun, hands-on activities? SJMA and San Juan Public Lands have teamed up to provide Four Corners teachers with presentations to fulfill your needs.

- Presentations are Free!
- Correlated with state standards
- Available for K-5th grade
- Presentations last 30-45 minutes
- Choose from these 4 themes
 - * Tree-mendous Trees
 - * Fire in the Forest
 - * Walk the Walk in the Outdoors
 - * Pumas on Parade

Please provide us with as much lead time as possible when scheduling presentations. Presentations on other topics may be available upon request. Presentations are geared for one classroom at a time.

Contact Gabi Morey 385-1256

Resources

<http://en.wikipedia.org/wiki/Tundra>

<http://en.wikipedia.org/wiki/Biome>

http://en.wikipedia.org/wiki/Riparian_zone

Educators—Become a member of SJMA today & receive a 20% off coupon to our bookstore!

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