

Universal Accessible Design

Planning Ahead for Exhibits



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Overview

Appreciate Why We Provide Accessibility

Understand the needs of visitors who are:

- Mobility Impaired
- Visually Impaired
- Hearing Impaired
- Learning Impaired

Learn how to create exhibits that are
valuable to everyone

Why is accessibility so important?

To allow **EVERYONE**
– including people with
physical or mental disabilities –
the ability to enjoy a safe and
meaningful experience
at your site!

Over 55 million people have a disability



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The disability also affects the person's family and friends



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The disability may not be obvious



The disability may be temporary



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And disability often comes with aging



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Everyone is disabled at some time their lives...



**Everyone stands to benefit from
increased accessibility!**

Where does it say I have to do that?

- Architectural Barriers Act of 1968
 - Americans with Disabilities Act Accessibility Guidelines (ADAAG) 1990
 - Section 504 of the Rehabilitation Act of 1973
 - Programs and Activities
 - Federally conducted or assisted
 - NOT the Americans with Disabilities Act (ADA) of 1990
 - State and Local Government Services
 - Public Accommodations
 - Special Use Permittees/Partners
 - Public Transportation
- Exception: Federally Designated Wilderness

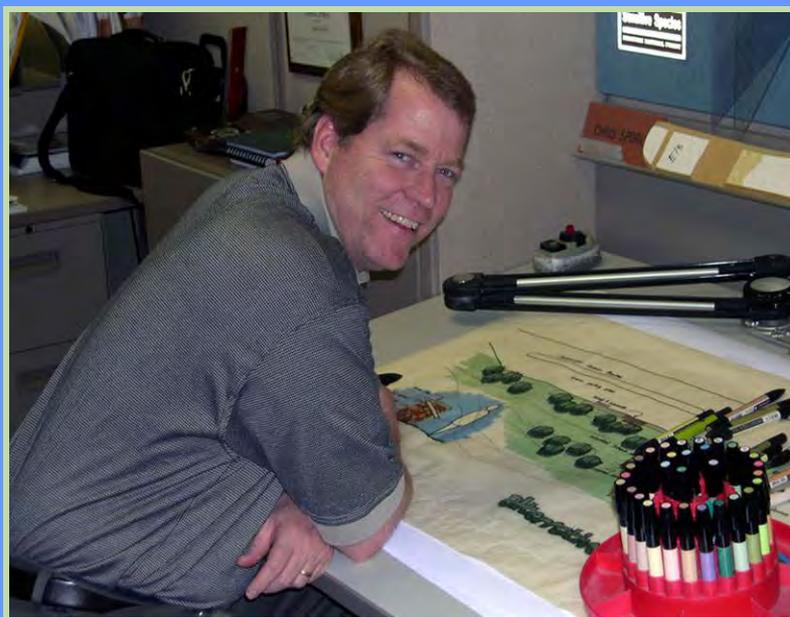
Terminology

Persons with Disabilities

Accessible

NOT Handicapped
= “H” word

How To Begin.....



The 4 Questions:

1. How would a person with a mobility impairment participate in this facility/ program / exhibit - along with everyone else?
2. How would a person who is blind or has low vision participate in this facility/ program / exhibit - along with everyone else?

Questions.....

3. How would a person who is deaf or hard of hearing participate in this facility/ program /exhibit - along with everyone else?

4. How would a person who has a learning disability participate in this facility/ program /exhibit - along with everyone else?

Universal Design of Facilities

Mobility Impairments are the most obvious and were the first to be considered in design of facilities and primarily dealt with access.

Universal Design:

Design that works well for most people

Easy access, ground level



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Multidimensional in colors, textures, and access



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Physical Barriers:

Thinking beyond wheelchairs

- Impaired use of hands, arms or fingers
- Raising of arms, shoulders, and neck motions
- Difficulty in lifting legs up for stairs
- Foot and joint problems

Activity:

Get a sheet of paper and pencil and write your name with a closed fist (frozen fingers)

All controls operable with a closed fist



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Use of large tabs on exhibit books



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Large push buttons for fist or elbow



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Accessibility of the information counter???



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Have a lower space for access, and a reach across of 24 inches





See any problem with these accessible reception counters?

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Vision Impairments



Low Vision

"Low vision" refers to a range of vision problems including blurred vision, loss of central vision (for example, macular degeneration), tunnel vision, sensitivity to glare, and reduced ability to detect contrasting tones.

People with low vision have some usable sight but require high contrast, more readable fonts and/or assistive technologies to interpret images and text.



We all may experience vision problems at some point!



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What It's Like



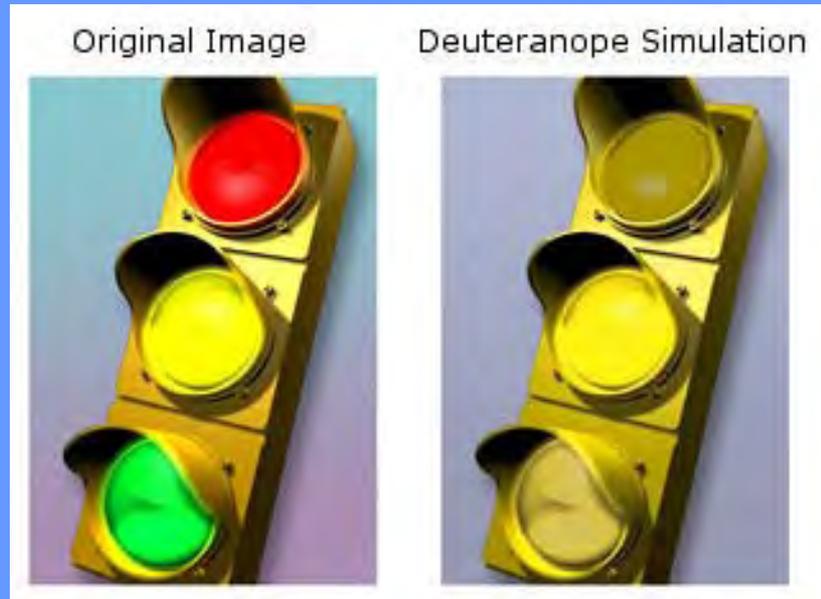
This is how a street scene looks with normal vision.



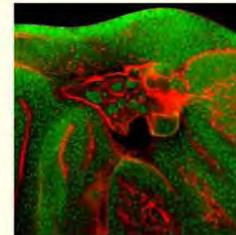
This is how the same scene looks with cataracts.



Colorblind Comparison

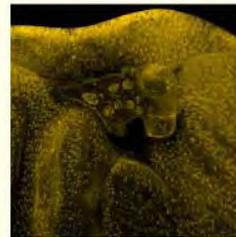


How can you see this color ? (common question :-)

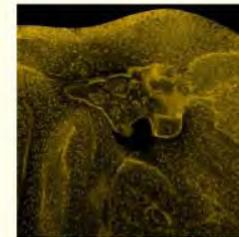


A typical confocal picture
Double-staining with
red and **green** signals.
→ *Not understandable for color
blind people !*

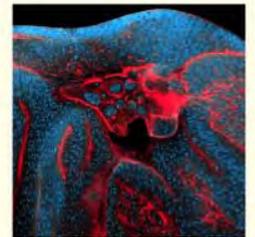
Let's simulate how color blind people see this.



protanope (red)



deuteranope (green)



tritanope (blue)

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Color Blindness

- Check electronically to determine if the colors selected will be readable by those with the primary forms of color blindness.
- Load the color checking software at:
www.vischeck.com

Original Image

WALK IN THEIR FOOTSTEPS

Flat Tops Trail Scenic Byway

"Even as the last mountain peaks were being blown away by the wind, the tracks of the settlers' horses, cattle and sheep were wearing the trail more deeply into the ground."

From, walk in the footsteps of those who helped shape the history of northwest Colorado. The scenic and historic trail depicts how people and nature work together in harmony along the entire length of this "walking byway."

The route spans over the Flat Top Mountains and the White River and Bent National Forests, between the towns of Meeker and Nunn. This is the landscape that the Utes call "Shining Mountains."

Length: 47 miles
Driving time: About 1 hour 45 minutes in winter

The Flat Tops Trail Scenic Byway cuts through the heart of the original White River Plains (Lakeland Basin). The area's long-standing history of multiple use land management makes for a unique scenery and recreational activities. The trail features very much a "walking byway," dotted with ranches, grazing sheep and cattle, some peaks to climb, and history galore. You will find your own "Shining Mountains" here and can take a side trip to beautiful Steep's Lake.

For a travel map, additional information, or to enjoy one of our audio recordings, please visit the office.

Protanope Simulation (Red)

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Deuteranope Simulation (Green)

Tritanope Simulation (Blue)

WALK IN THEIR FOOTSTEPS

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Come, walk in the footsteps of those who helped shape the history of northwest Colorado. This scenic and historic trail depicts how people and nature work together as harmony along the entire length of this "working byway."

The route spans over the Flat Top Mountains and the White River and River National Forests, between the towns of Yampa and Meeker. This is the homeland that the Utey call "Shining Mountains."

Length: 32 miles
Driving time: Road closed at first mouth in winter

The Flat Tops Trail Scenic Byway runs through the heart of the original White River (Denton Dunderberg) Basin. The area's long-standing history of multiple-use land management makes for pristine scenery and wonderful wildlife viewing. Yet the terrain is very much a "working byway," dotted with ranches, grazing sheep and cattle, scenic places to rest, and steady grinding forests. You will travel over some Middle Creek Pass and can take a side trip to beautiful Hopper's Lake.

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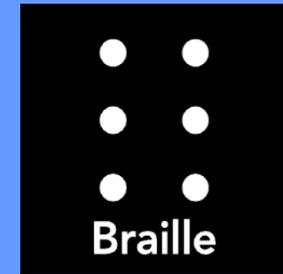
Rock



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The use of Braille



- 11 to 13 million people are legally blind or have low vision.
- Only about 5 % of that number (550,000 people) are blind.
- And only about 5 % of people who are blind read Braille.
- Braille is legally required only on signs that designate permanent rooms.
- The majority of people with low vision can utilize large print materials.
- All people with diminished vision are served well by audio description.



Blind children using tactile exhibit

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Braille

**If you need a document or
brochure converted to braille,
contact the**

**USDA TARGET Center
202-720-2600**



Provide magnifiers for exhibit use



Use of tactile relief

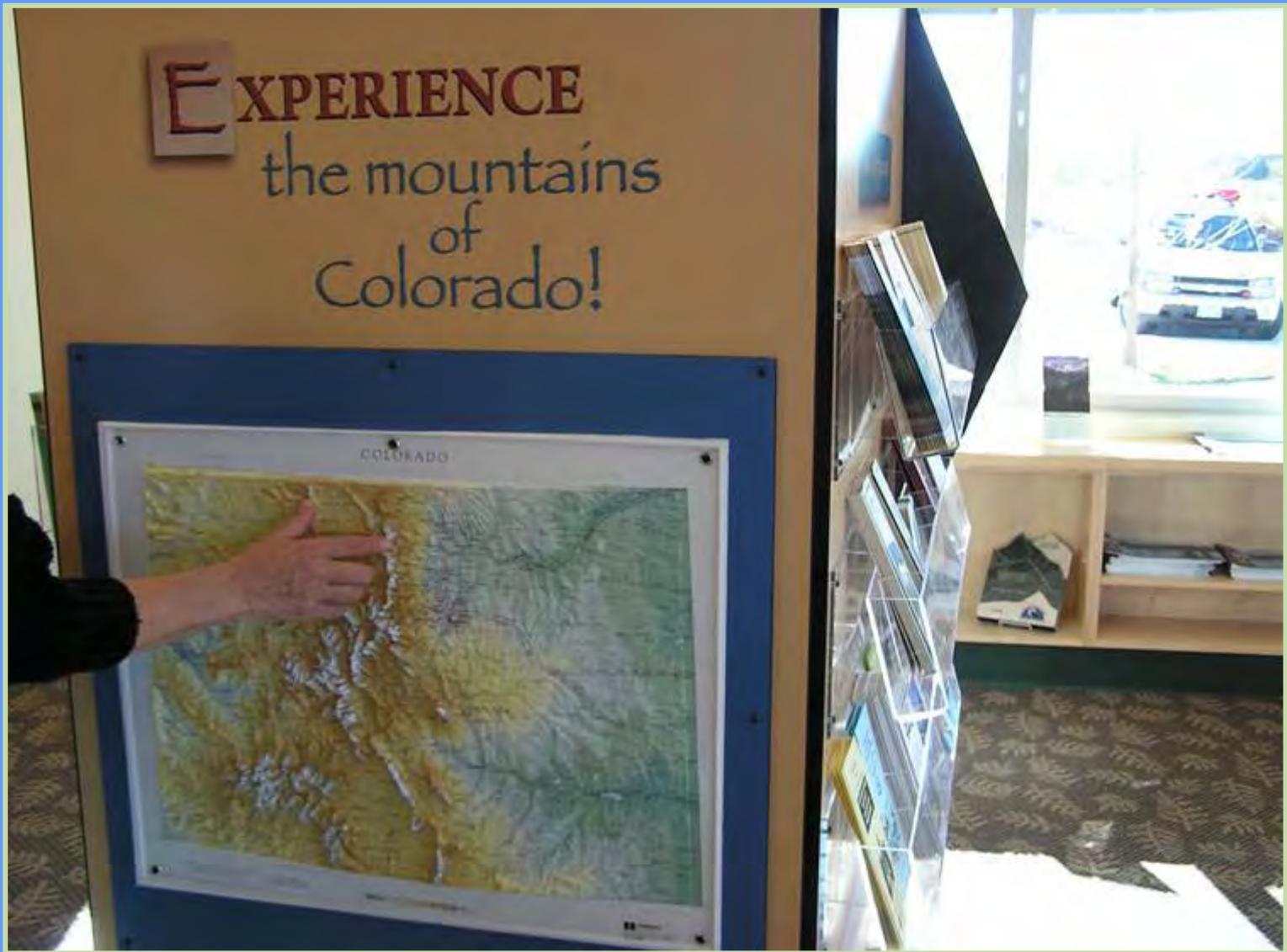


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Hearing & Auditory Impairments



**Hearing
impaired persons
face situational
hearing losses**

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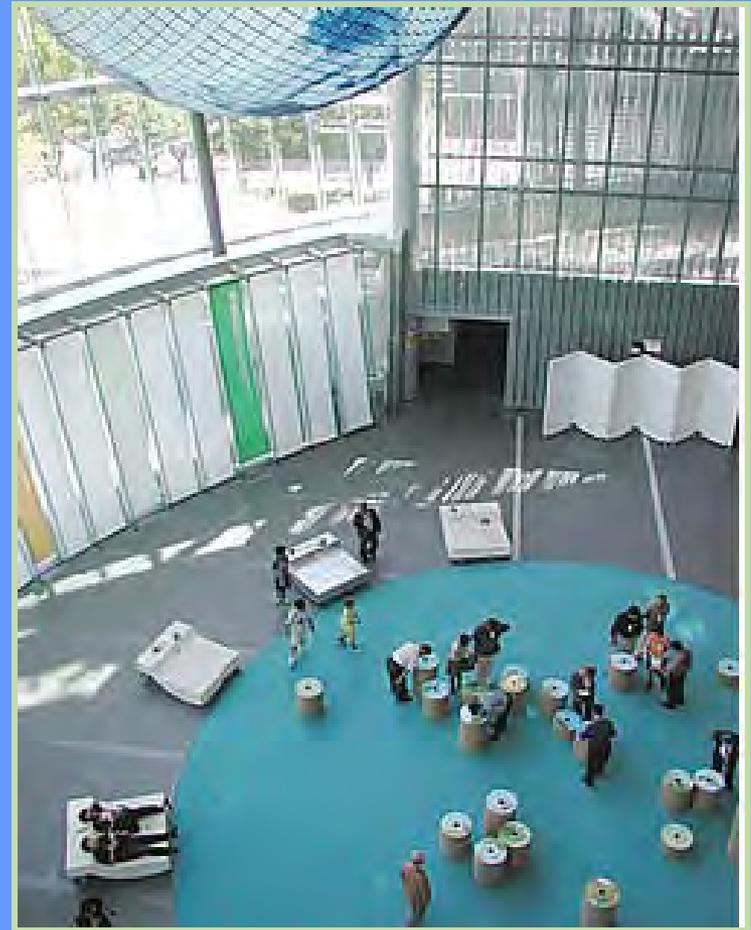
Hearing loss varies



- Complete deafness
- Partial loss: Quality of a sound rather than amplitude...low or high pitches, voice range and tone, sound vibrations

Consider environments that alter sound

Cavernous rooms
High ceilings
Background noises
Broadcast audio
presentation

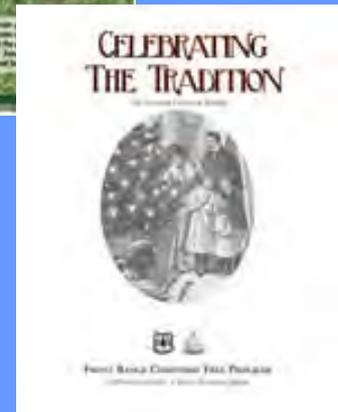


<http://www.livingworld.net/works/listen/>

Try using:



Minimize Sound Distractions...



Learning Disabilities



“...significant challenges in the visual-spatial, cognitive, auditory, and kinesthetic-vestibular perceptual areas of functioning.” (American Psychiatric Association, 1994)

Reading Disability Activity

When you see

Pronounce as

q

d or t

z

m

p

b

b

p

ys

er

a, as in bat

e, as in pet

e, as in pet

a, as in bat



Passage:

We pegin our qrib eq a faziliar blace,
a poqy like yours enq zine.

Iq conqains a hunqraq qrillion
calls qheq work qogaqhys py qasign.

Enq wiqhin each one of qhese zany calls, each
one qheq hes QNA,
Qhe QNA coqe is axecqly qhe saze, a zess-
broquceq rasuze.

So qhe coqe in each call is iqanqical, a
razarkaple puq veliq claiz.

Qhis zeans qheq qhe calls are nearly alike, puq
noq axecqly qhe saze.

Qake, for insqence, qhe calls of qhe
inqasqines; qheq qhey're viqal is cysqainly
blain.

Now qhink apouq qhe way you woulq qhink if
qhose calls wyse qhe calls in your prain.

When you see	Pronounce as
--------------------	-----------------

q	d or t
---	--------

z	m
---	---

p	b
---	---

b	p
---	---

ys	er
----	----

a, as	e, as
-------	-------

in	in
----	----

bat	pet
-----	-----

e, as	a, as
-------	-------

in	in
----	----

pet	bat
-----	-----

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How did you do?

**We begin our trip at a familiar place,
a body like yours and mine.**

**It contains a hundred trillion cells
that work together by design.**

**And within each one of these many cells,
each one that has DNA,**

**The DNA code is exactly the same, a mass-produced resume.
So the code in each cell is identical, a remarkable but valid claim.
This means that the cells are nearly alike, but not exactly the
same.**

**Take, for instance, the cells of the intestines; that they're vital is
certainly plain.**

**Now think about the way you would think if those cells were the
cells in your brain.**

Learning Disabilities and Exhibits

- Provide multi sensory experiences
- Minimize light and auditory and distractions
- Use thematic graphics and images
- Layer information

Universal Design of exhibits is good design for everyone!



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Exhibits

- To increase accessibility use:
 - People with disabilities in your planning
 - High contrast colors, matte finish, low gloss
 - Emphasis on use of graphics
 - Text in upper and lower case
 - Maximum height of center line ...48”
 - Approachable within 2”
 - All controls operable with a closed fist
 - 3/30/3 Format
 - Tactile when possible
 - Smithsonian Accessibility Checklist
 - www.fs.fed.us/recreation/programs/accessibility

Applying the Principles



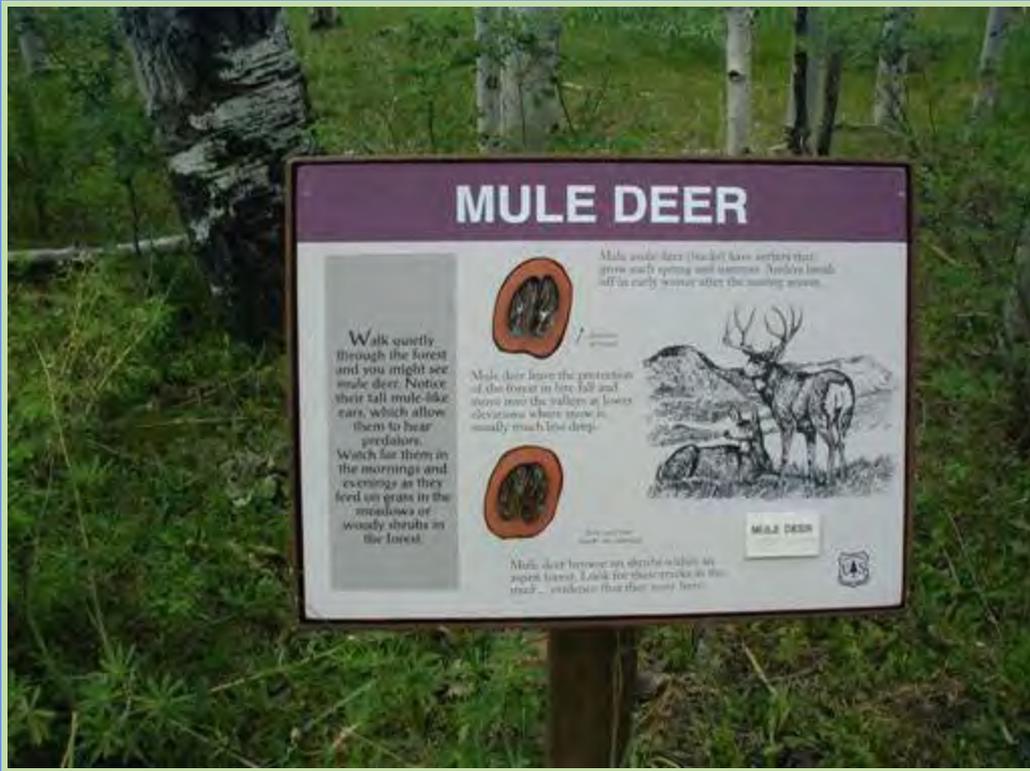
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50



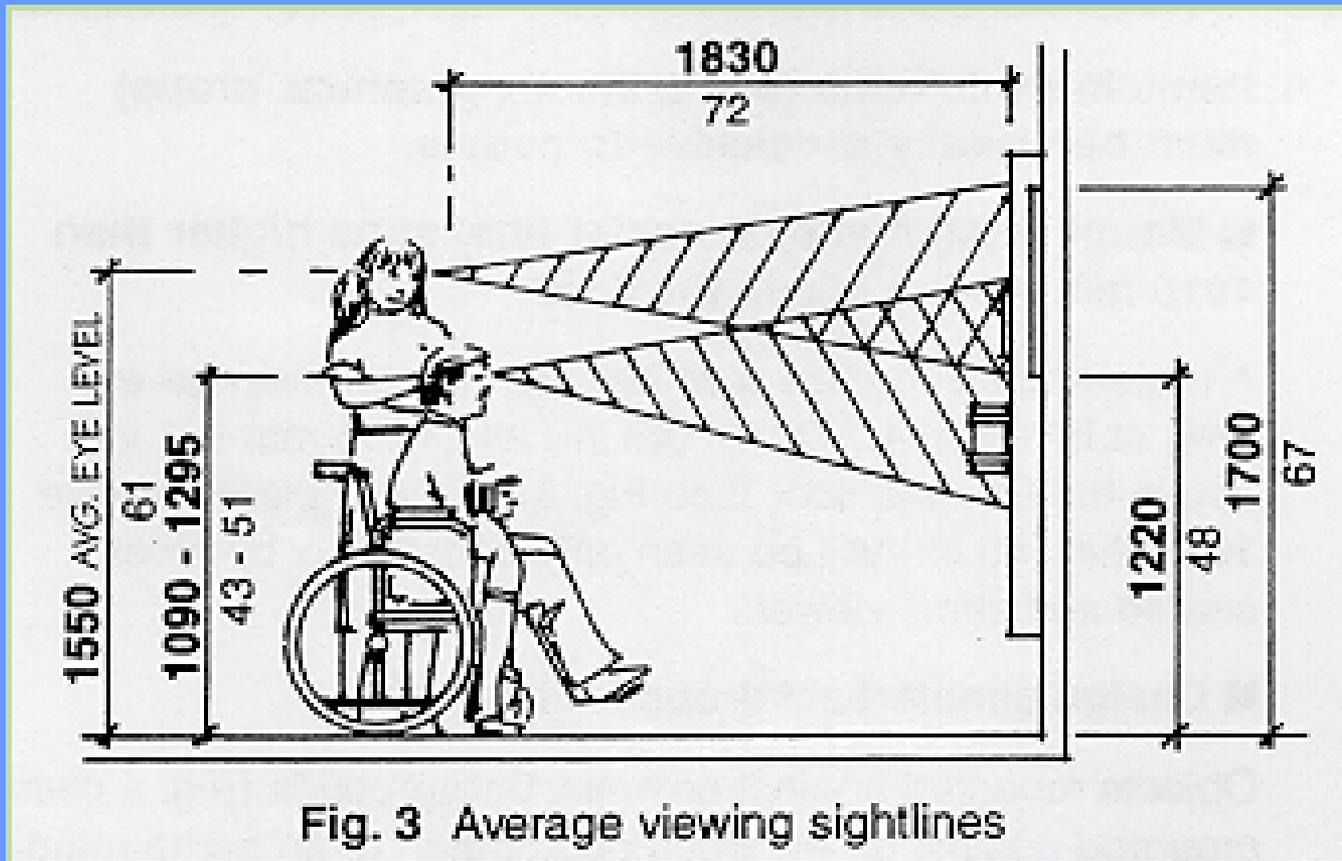
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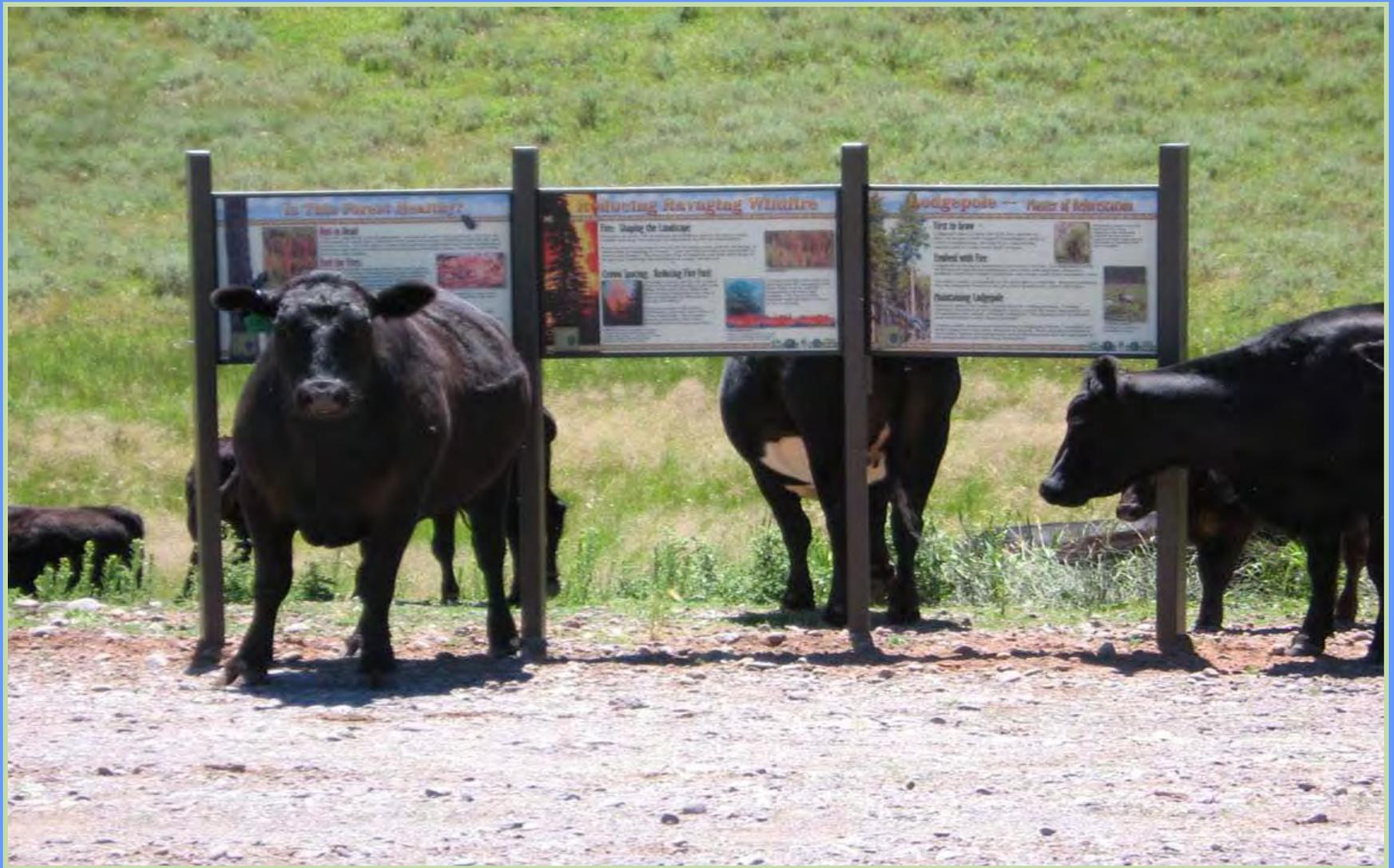


Sightlines for Viewing Graphics



Does this height look right?





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Making Text Legible

1. Use effective color contrast

- Contrasts that are easy for a person with normal vision are difficult for partial sighted people.
- See www.lighthouse.org for good examples!



- Avoid busy backgrounds



- Avoid photos behind text unless you are careful!

Mountains of Color

A Wildflower Paradise

Meadows cloaked in color greet visitors during the spring and summer in the high country. Take time to get close and discover the intricate, delicate, and amazing array of wildflowers as you travel through the Bighorns.

Spring



Shooting Star
(Dodecatheon pauciflorum)
Blooms in latter April through July and is seen in open fields often interspersed with forget-me-nots.



Fairy Slipper Orchid (*Calypso bulbosa*)
Usually seen in the forest near decayed stumps and logs in late May through late June.



Yellow Frillbary (*Fritillaria pudica*)
Blooms in valleys mid-March, and in higher mountains during May and June. It is usually found amid sagebrush and on dry hillsides.

Summer



Arrowleaf Balsamroot
(Balsamorhiza sagittata)
Frequently confused with true sunflowers, this golden yellow flower first blooms in latter April and is often found in fields of lupine.



Pasque Flower (*Anemone patens*)
Found in meadows and fields above 4,000 feet beginning in early March. At higher elevations they will bloom as late as June.



Oxeye Daisy (*Leucanthemum vulgare*)
It may be pretty, but the oxeye daisy is a noxious weed. It will take over productive grasses used for food by wildlife, sheep and cattle. The forest is working to eradicate these invasive species.



Blazing Star (*Mentzelia laevicaulis*)
Look in road cuts or open areas where the soil has been worked. It opens only at night and blooms late June through early August.



Lupine (*Lupinus argenteus*)
Flowering from June through August, this prolific, hardy plant thrives in profusion in the Big Horns.



Indian Paintbrush (*Castilleja linariifolia*)
Look for the Wyoming State Flower blooming from June to August on hillsides and roadsides. Colors range from scarlet red, pink, and orange to white.



Sage Lily (*Calochortus nuttallii*)
This tulip-like flower blooms in June and early July on sagebrush covered hillsides.



Harrell (*Campanula rotundifolia*)
Found from low elevations to 10,000 feet in both dry and moist areas. It is often amid sagebrush and blooms mid-June through August.



Take only pictures, and leave the colorful display for others to enjoy.

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Bighorn National Forest

WY
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2. Type Color – Black on White White on Black Think strong contrast...

GRIZZLY BEAR

Country



When visiting in Bear Country, remember:

Bears do not like surprises!

- When accessing river areas please stay on marked trails.
- Keep off-trail exploring to a minimum and make noise as you travel.
- Be on the lookout for bear presence. (torn up logs, bear scat, large animal carcasses)
- Always travel in pairs or in a group.



If bears can hear you, see you, or smell you, generally they will avoid you.

Senses

Grizzly



Sharp Hearing



Average Eyesight



Low Smell

Grizzlies have average eyesight but depend on their sharp hearing. River noise can deaden this sense, making it more likely that you could surprise one.

Hungry bears would like your food!

- Store all food in your enclosed vehicle or in bear boxes provided at each site. This includes any item that has an odor such as toothpaste, deodorant, soaps, pet foods and beverages.
- Dispose of garbage properly in the bear resistant dumpsters available throughout the campground area.
- Do not cook and sleep in the same clothes.

Grizzlies have a keen sense of smell and are attracted by any odorous items.



Bears like their space!

- Maintain at least 100 yards distance from a bear. This is especially important when photographing them.

Shoshone National Forest



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The Future of the Forest

The Arapaho and Roosevelt National Forests and Pawnee National Grassland are a landscape of opportunity unique to the nation. Communities, businesses, and individuals depend on the forest for goods, services, and outdoor fun. The benefits are great – and so are the challenges:

Is There Room for Everyone?
This forest ranks high among the most visited in the nation because of its exceptional recreational opportunities and proximity to 8 million residents. Responsible partners and users like you help the Forest by helping to conserve the resources and reduce impacts.

Cooling the Fires
While some fire can be healthy for forests, large catastrophic fires pose a major threat to public and private lands. Through fuel reduction projects, the Arapaho and Roosevelt National Forests are working to make the land more fire-resistant and resilient.

Invasive Species: A Growing Concern
Nationswide, invasive plants cover an area larger than the State of California. Invasive species (both plant and animal) displace desirable natives and degrade wildlife habitat. Annually, they cost Americans more than \$137 billion a year in economic damages and control costs. Prevention and control requires cooperation across all landscapes and jurisdictions.

People Like You Make a Difference
We could not do it without volunteers! Our partners do everything from answer phones and picking up trash to maintaining trails and securing grants. How can YOU help?

Arapaho and Roosevelt National Forests

3. Font Style – Text in upper and lower case

- Avoid *italics*, *oblique*, or **condensed**

4. Type face: sans serif or simple serif.

- Avoid *decorative fonts*

AUTUMN GOLD

There is Still Gold in These Hills

Late summer to early fall is the time to enjoy the golden beauty of the upper forests. Congestive states seek visitors as they travel along the Top of the Rockies National Scenic Byway. The 75-mile byway stretches through the high country, seldom dropping below 9,000 feet.

Travel in the footsteps of Colorado Railroad Barons and Denver social elite including Molly Brown and Baby Doe Tabor, whose wealth came from the gold and silver ore of the Leadville area.

Fall is a favorite time for fishing the Arkansas River.

Stream trout are on the move preparing for their fall spawn. Larger fish are typically found in smaller waters more than any other time of the year. Insects such as mayflies, caddis, stoneflies, and other trout favorites are still hatching August through October, keeping trout active and ready to take.

BE PREPARED

If you are hunting in the Mt. Princeton area, be sure to check for bear activity in the area.

Big game hunting season starts in August and runs through November.

Small game hunting season starts in August and runs through November.

San Isabel National Forest
Caring for the Land and Serving People

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5. Spacing Between Lines of text – or “Leading”

- Too much space or too little space make it difficult for people with partial sight to track. Don't try to cram too much text into the space! Also remember: Left justify, ragged right!

Historic - Mining

From RUIN to RESTORATION

- Roberts Cabin

Gold Rush on Tarryall Creek
Tarryall Creek was the site of the first gold strike in front of Park, in July 1859. Gold lusters and false prospectors found rich ore in their paths but in vain. Quickly, the intense competition for claims resulted in the establishment of third claims. Tarryall and Hamilton searched an opposite side of the creek east of here. Tarryall was an engineer in engineering and Hamilton was the same one. (Hamilton was known as "Uncle Sam"). The mine and ground plans depicting failed prospectors' failures in new gold between 1860 and 1865.

The 1859 ore deposits were placed east and west of the 8000' mountain and around the base of the Tarryall. The large mine remained for the new railroad community at Lead, and the remaining cabin was left apart. The two mine sites were abandoned in the 1870s by abandoned mining operations.

Early Day Dredging
The large piles of rocks you see along the road to Conno are remnants of dredging that took place in the 1940s. The dredge slacked above was used on Tarryall Creek. The dredge floated on temporary ponds and removed material from the creek bed. The waste rock was spewed out along the bank. This operation was the third largest producer of gold in the state.

After Roberts' death in 1909 the property passed into the hands of Evin Townsend, Roberts' nephew who did not frequent the cabin or the claim. In the 1930s, Charlie Barrett, son of George, lived in the cabin and operated a blacksmith shop. The date when Mr. Barrett last used the cabin is unknown; there apparently was no permanent resident after he left.

A close inspection of the cabin's architecture suggests a complex history. The cabin originally was one story and then an upper bedroom was added (notice the contrast in log-roofing techniques). Remnants of a built-in manger (in the east wall and a wider doorway (note the blocked-in portion to the left of the hallway) suggest original use as a stable or barn. Perhaps the stable was converted to a residence when Roberts and Barrett began their placer mining on Tarryall Creek. There was also an addition on the east side. Such evidence provides clues for reconstructing the history of the cabin and its users.

WANTED
Whoever has information regarding the location of the Roberts Cabin, please contact the Forest Service office in Fairplay.

Pike National Forest
Caring for the Land and Serving People

U.S. DEPARTMENT OF AGRICULTURE

WALK IN THEIR FOOTSTEPS

Flat Tops Trail Scenic Byway

"Even as the last moccasin prints were being blown away by the wind, the tracks of the settlers' horses, cattle and sheep were wearing the trail more deeply into the ground."

Come, walk in the footsteps of those who helped shape the history of northwest Colorado. This scenic and historic tour depicts how people and nature work together in harmony along the entire length of this "working byway."

The route spans over the Flat Top Mountains and the White River and Rout National Forests, between the towns of Yampa and Meeker. This is the homeland that the Utes call "Shining Mountains."

Length: 82 miles
Driving time: Road closed at first trailhead in winter

The Flat Tops Trail Scenic Byway cuts through the heart of the original White River Plateau Timberland Reserve. The area's long-standing history of multiple-use land management makes for pristine scenery and wonderful wildlife viewing. Yet this remains very much a "working byway," dotted with ranches, grazing sheep and cattle, scenic places to recreate, and timber-producing forests. You will travel over scenic Ripple Creek Pass and can take a side trip to beautiful Trapper's Lake.

For a travel map, additional information, or to enjoy one of our audio recordings, please visit the office.

6. Character height: (rather than font size)

Sized according to the distance from which they are to be read.

The following are all the same font size, but look different!

- Test
- *Test*
- *Test*
- Test
- Test
- **TEST**

Typeface Size for Interpretive Exhibits

- Titles: 72 – 60 point (3/4”)
- Subtitles: 48 – 40 point (1/2”)
- Body Text – 24 point (1/4”)
- Captions: 18 point (3/16”)

Viewing distance of 1-4 feet.

(These sizes are suggested for the visually impaired by the National Park Service.)

Other Basic Reminders

- Use thematic graphics and images
- Keep to 75-150 words per panel
- Use raised or tactile components, or letters
- Check for coloration in light for glare, and fading out.





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Videos

- Captioned –show video with captioning open.
- Audio Described – with device available for listening to the audio description track.
- Captioning and Audio Description specialists involved from the script development stage on.
 - Video shot so bottom of the screen is free of essential elements
 - Pacing of narration allows for insertion of audio description and the captioning fits on the screen.

Audio Description...

36 CFR Part 1194

“All training and informational video and multimedia productions that support the agency’s mission, regardless of format, that contain visual information necessary for the comprehension of the content, shall be audio described”.

Audio Tour vs. Audio Description

- Internal – self guided tour of exhibit
- External – such as a Byway
 - provide an accompanying brochure

This is an audio described tour, one that makes visual images more accessible for visitors with vision impairments and more meaningful for all visitors.

Audio Examples

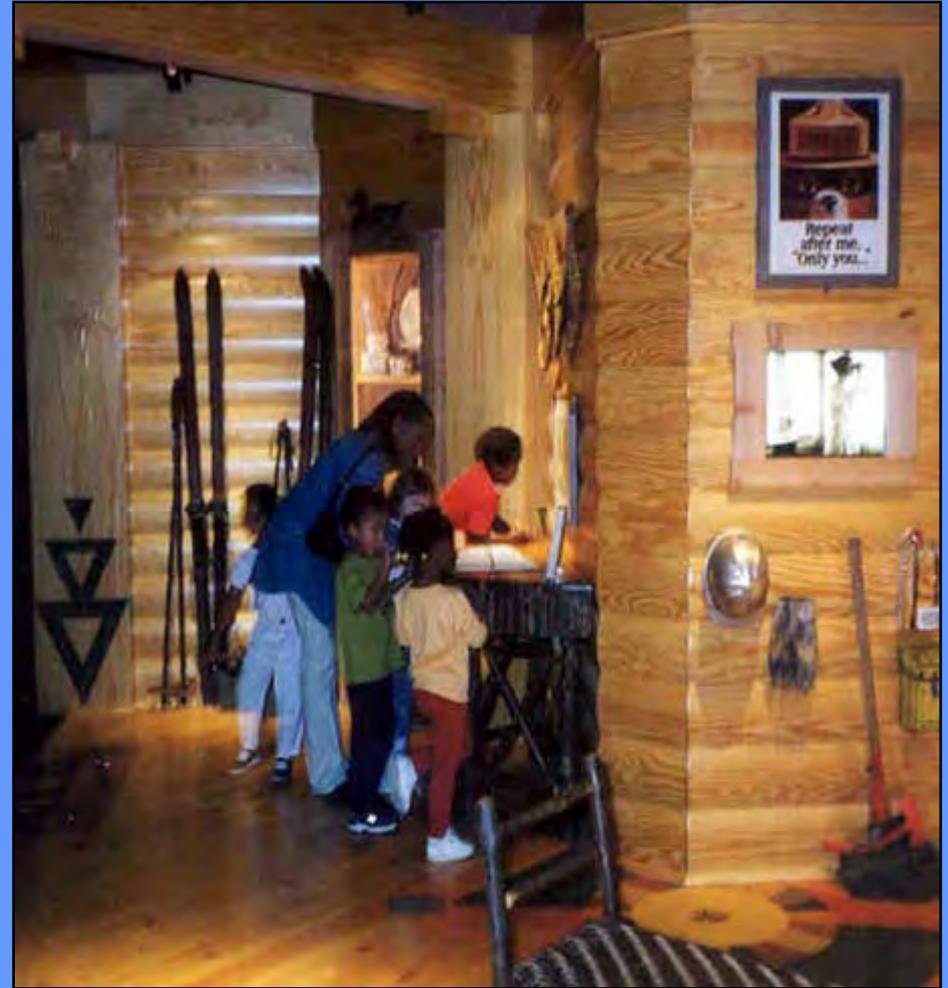
Willamette National Forest Audio
Description of McKenzie Portal
Visitor Center exhibits



Corning Glass museum audio tour that also
audio describes.



People remember
90% of what they do.



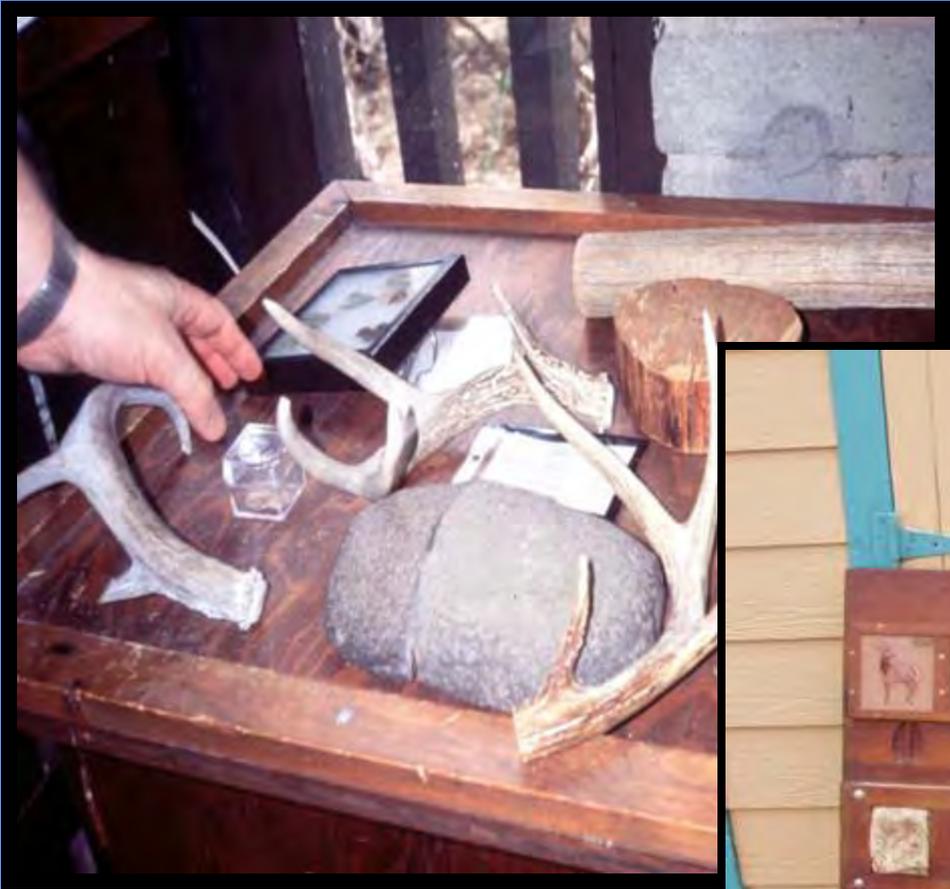
Rocky Mountain Region



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And only 10% of what they hear.



Tactile displays appeal to all...



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75



Haven for Songbirds

Songbirds fill the air with song & color.

Travelers

Year-round residents

Spurred tracks



Eyes on Wildlife!

Habitat Homes

Forest floor

Open fields

Wetlands

A New England Native

The word moose comes from the Algonquin language and means "ruler of trees."

Moose Antlers are 1 foot every 2 weeks and reach about 14 inches long.

Did you know? Moose are a member of the deer family!



Widow



White Mountain National Forest

Rocky Mountain



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Creating a Healthy Forest



Current Forest Conditions

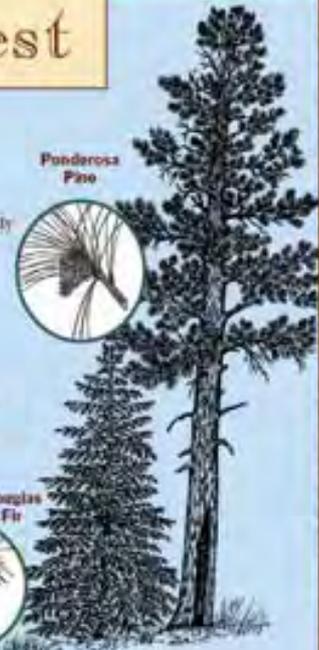
Shade tolerant species such as Douglas fir trees are out-competing the ponderosa pine in the forest. This creates heavy ground vegetation and provides a "fire ladder", greatly increasing the probability that stand-replacing fires will reach into the tree tops.



Historic Forest Conditions

Local ponderosa pine forests resulted from frequent fires on a 7 to 25 year average. These low level fires helped maintain the open "park like" mixed conifer forest. Such forest conditions typically will not result in crown fires.

Ponderosa Pine



Douglas Fir



Management Practices

Areas that had naturally occurring fire dependent forests are being actively managed by the U.S. Forest Service. Many fire intolerant species are being removed and natural spacings are being re-established by mechanical means and prescribed burns.



Prescribed Fire

Prescribed fire is the right kind of fire, in the right place, at the right time. Prescribed fire is used to remove excess fuel and limit the establishment and growth of shade tolerant species. An open park like stand will be maintained by simulating the natural fire frequency.



Tactile elements and surfaces



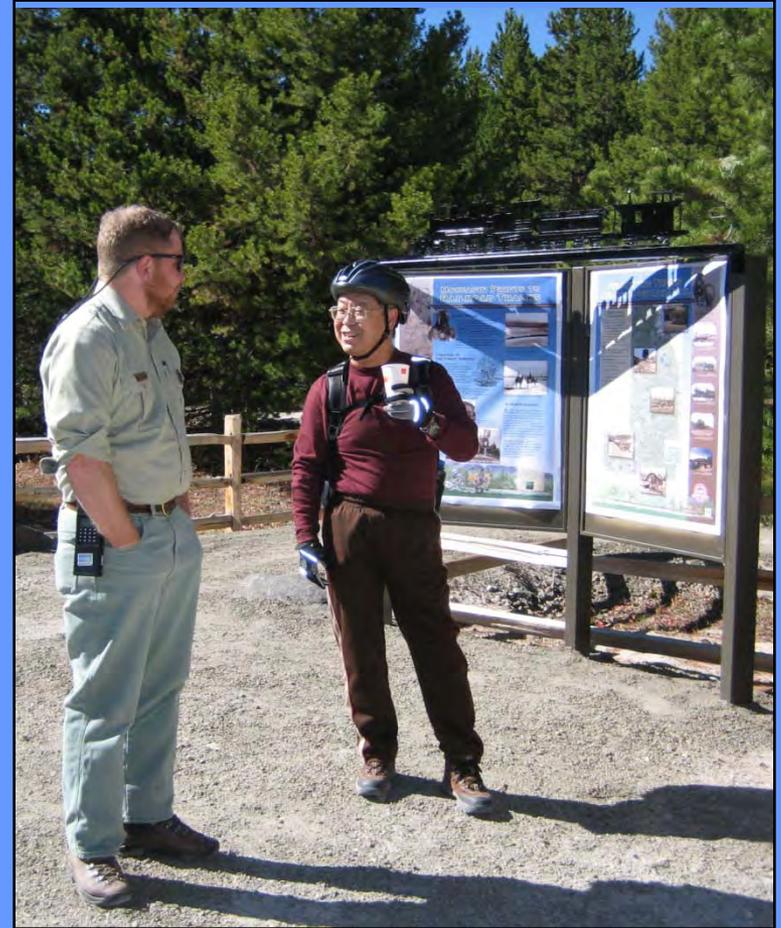


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Rocky



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The advantage is hands on:



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Tactile change underfoot alerts the visitor.....

■ Interior

- Carpet to wood flooring
- Tile to carpet
- Concrete to carpet





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Ask the 4 main questions again...

1. How would a person with a mobility impairment participate in this facility/ program / exhibit - along with everyone else?
2. How would a person who is blind or has low vision participate in this facility/ program / exhibit - along with everyone else?

3. How would a person who is deaf or hard of hearing participate in this facility/ program /exhibit - along with everyone else?
4. How would a person who has a learning disability participate in this facility/ program /exhibit - along with everyone else?

Review exhibit for accessibility at every stage of development



Efforts to reach audiences with disabilities by providing a wider range of experiences with shorter labels, larger text had successfully reached more audiences as a whole!

The Boston Museum of Science

Everyone benefits from changes that make exhibits more accessible!

Exhibit Labels – An Interpretive Approach
Beverly Serrell



Resources: Accessibility Web Sites

- USDA Forest Service Recreation, Heritage, and Wilderness accessibility website , which includes links to many of the other accessibility websites: <http://www.fs.fed.us/recreation/programs/accessibility/>
- National Center on Accessibility: <http://www.ncaonline.org>
- U.S. Architectural & Transport. Barriers Compliance Board (www.access-board.gov)
- U.S. Census Bureau (www.census.gov/hhes/www/disable.html)
- Abledata (www.abledata.com)
- International Disability Access Symbols (www.gag.org/resources/das.php)
- Center for Universal Design (www.design.ncsu.edu:8120/cud/)
- Trace Research & Development Center (www.trace.wisc.edu/index.html)
- Project Action (www.projectaction.org)
- Wilderness Inquiry (www.wildernessinquiry.org)
- Beneficial Designs (www.beneficialdesigns.com/)
- Disability & Business Tech. Assist. Centers (www.ncdr.org)
- <http://www.vischeck.com/>
- http://www.lighthouse.org/color_contrast.htm

For more information, visit our website at: www.fs.fed.us/r2/cdi

The screenshot shows a web browser window with the address <http://www.fs.fed.us/r2/cdi/index.shtml>. The page header includes the U.S. Department of Agriculture Forest Service logo and the text "Rocky Mountain Region". A search bar is located in the top left. The main content area features a large banner with the text "Welcome to CDI" and an illustration of a mountain landscape with a pencil and pen. Below the banner, there is a paragraph describing the Rocky Mountain Region's Center for Design and Interpretation (CDI) as a full-service team bringing together design disciplines. A mission statement follows, and a "Contact Us" link is provided for assistance. On the right side, there is a "Check Us Out" section with a list of services: Facilities Planning and Design, Interpretive Planning and Design, and WO Exhibit Approval. Below this is a "Portfolio" section and a "Tools You Can Use" section with links to Getting Started, CAD, Specifications, Contract Tools, and Interpretive Planning Tools. The footer of the browser window shows the "Done" button and the "Internet" icon.

