

**To:** Miller, Kevin[khmill@blm.gov]  
**Cc:** Matthew Betenson[mbetenso@blm.gov]; Crutchfield, Larry E[lcrutchf@blm.gov]; Wobbe, Kristen[kwobbe@blm.gov]; Froistad, Alisa[afroistad@blm.gov]  
**From:** Staszak, Cynthia  
**Sent:** 2017-06-30T10:00:48-04:00  
**Importance:** Normal  
**Subject:** Re: review of GSENM Story Map  
**Received:** 2017-06-30T10:01:43-04:00  
GSENM StoryMap TextForPubReview 20170612 2ndReview cs edits.docx

Kevin:

Thanks for the review. I made a few edits in the "Objects and Values" statements throughout the document. Solicitor Steiger is clear that that the Antiquities Act protects **objects**. The "values" portion of that statement was added via NLCS Manuals, with little context or definition. I also did a little editing on the Grazing plan info.

Larry & Matt may have additional edits, but I wanted to get these to you asap.

Thanks

***Cindy Staszak  
Monument Manager  
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On Fri, Jun 30, 2017 at 7:16 AM, Miller, Kevin <[khmill@blm.gov](mailto:khmill@blm.gov)> wrote:

Cindy, Matt and Larry,  
I have gone through Cynthia Hernandez's edits and comments, answered her questions, and suggested revisions based on her comments (attached). Kris and Alisa had asked me to do this in advance of our call next Weds, 7/5. Let me know if you have any questions about anything I've said. I hope to talk with you next week.

Best, Kevin

--

Kevin H. Miller  
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*Rapid Ecoregional Assessments (REAs) are part of BLM's Landscape Approach. REAs examine ecological values, conditions, and trends within ecoregions to improve understanding of existing landscapes and likely effects of climate change and other wide spread changes in the biophysical environment and land uses.*

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On Thu, Jun 29, 2017 at 6:19 AM, Miller, Kevin <[khmiller@blm.gov](mailto:khmiller@blm.gov)> wrote:

Cindy,

I wanted to check in to see whether you have any comments on the GSENM Story Map. We received the attached edits from Cynthia Hernandez in WO Public Affairs yesterday. Kris, Alisa and I plan to meet next week, Weds., July 5 at 3 pm, to discuss these suggestions. We'd like to extend an invitation for you to join us then, or to send us any edits, comments, or suggestions you have. I'll send out a Google Calendar invitation with a conference line, and (separately) a webex link. If you'd like to meet with us but this time is not suitable, please let us know an alternative time.

Thanks, Kevin

--

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On Thu, Jun 22, 2017 at 10:29 AM, Miller, Kevin <[khmiller@blm.gov](mailto:khmiller@blm.gov)> wrote:

Cindy,

I wanted to check to see whether you folks have had a chance to review the Story Map. I believe you, Matt and Larry have all been granted access (I spoke to Larry about that a

week or so ago). We wonder whether you have any comments or would like to schedule a conference call (and/or a demo?) to discuss it? We'd be happy to meet with you any time that suits you.

Thanks, Kevin

--

Kevin H. Miller  
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## GSENM Story Map:

<http://blm.egis.maps.arcgis.com/home/item.html?id=cef9f6d254d1487ab71c82cefc766975>

## Page 1 (Home)

## Taking a Landscape Approach to a Management Plan

## Grand Staircase-Escalante National Monument

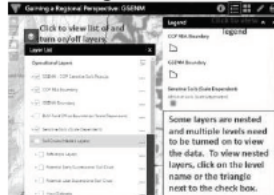
The Grand Staircase-Escalante National Monument (GSENM) is undergoing a Grazing Plan Amendment that will integrate livestock grazing and rangeland management with the management of GSENM objects and other resources. The Bureau of Land Management (BLM) is applying a broad scale approach to this planning process by analyzing regional trends observed for the Colorado Plateau (COP) Rapid Ecoregional Assessment (REA) in relation to their distribution and status in the GSENM. This Story Map looks at the following regional trend topics:

- Current Terrestrial Intactness
- Habitat Connectivity
- Road Density
- Sensitive Soils

The other sections of this Story Map have interactive maps that allow you to further explore the relation between the COP Ecoregion and the GSENM. Some things to note about using the interactive maps:

- The data in maps may load at various speeds, some taking 10–20 seconds to load.
- Some of the layers in the maps will not draw when zoomed out beyond a certain scale. When zoomed out too far, the layer name in the layer list will be grayed out.
- Some of the maps have nested layers. To view these layers, some levels may need to be expanded and turned on and layers above may need to be turned off.

See the image below for an example of nested layers and other map features.



## Page 2

## Defining the Landscape: GSENM in Relation to the COP Ecoregion

**READ IT**

Ecoregions define similar ecological and biophysical areas. Placing the GSENM into context within the COP Ecoregion helps inform BLM's management decisions.

**SEE IT**

Use the interactive map to the right to explore the GSENM and COP Ecoregion. Look at:

- The proportion of the size of the GSENM in relation to the COP Ecoregion.
- The size of cities, the distribution of roads, and the variety of surface management.

**Commented [FAB1]:** Broad Scale Approach?

(b)(5) DPP

**Commented [FAB3R1]:** Fixed to say broad scale approach.

**Commented [MKH6R5]:** Yes, for now (see comment above).

**Commented [FAB7R5]:** Fixed to say broad scale approach.

**Commented [HCE8]:** Passive voice.

**Commented [HCE9]:** Plain language

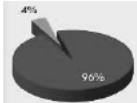
**DO IT**

- What percentage of the COP Ecoregion's total area is covered by the GSENM? Click on the ⓘ symbol on the map to find out.
- View the legend for the "Cities (by Population)" dataset to compare the general population sizes between the cities.
- View the legend for the "Surface Management Agency" dataset to see the variety of agencies with surface management in the area.

Pop up:

**GSENM in Relation to the COP Ecoregion**

GSENM is 4% of the COP Ecoregion. Because the COP Ecoregion is a much larger area, it has more



variation in land use and condition.

Page 3

**Defining the Landscape: GSENM Objects and Values****READ IT**

**Integrating livestock and rangeland management with the management of GSENM objects and resources** is a major component of the Livestock Grazing Plan Amendment Environmental Impact Statement (EIS). Some of the objects within the GSENM are:

- Geologic Resources; exposed stratigraphy, structures, sedimentary rock layers, vast geologic land formations Paleontologic Resources; significant fossils of mollusks, turtles, crocodilians, lizards, dinosaurs, fishes and mammals.
- Prehistoric & Historic Resources; Anasazi and Fremont cultures, rock art panels, occupation sites, campsite and granaries. Biologic resources: diverse soils, wildlife habitat, and terrestrial ecosystems

The management of these GSENM Objects and resources benefits from partnerships with many individuals and organizations, including permitted users (such as ranchers, outfitters and guides and recreationists), adjacent land owners and managers (including private land owners, the State of Utah, USFS and NPS), local government (Kane and Garfield Counties, the Cities of Kanab, UT and Page, AZ, and the Towns of Escalante, Boulder, Big Water, and Cannonville), local businesses, and non governmental organizations.

**SEE IT**

Use the interactive map to the right to explore the natural and developed areas and features in the vicinity of the GSENM and COP Ecoregion. Look at:

- Natural areas, features, and terrain.
- Cities and roads.

**DO IT**

Click on the ⓘ symbols on the map to see some examples of the natural and developed areas and features in the vicinity of the GSENM and COP Ecoregion.

Pop up 1:

(b)(5) DPP

**Urban Areas**

Within the COP Ecoregion, dense urban areas [reduce the ecological integrity](#) in that location. Click on the image below to visit XYZ's webpage.



Commented [HCE20]: Plain language.

Commented [HCE21]: Link broken??

Pop up 2:

**Colorado River**

The steep canyon walls of the inner gorge along many parts of the Colorado River separate these regions from the higher plateaus and benches above. Click on the image below to visit BLM's webpage for recreation activities in Utah.



Pop up 3:

**Desert Bighorn Sheep**

The COP Ecoregion has several key species, including the Desert Bighorn Sheep. While not shown in this map, COP REA accounts for desert bighorn in the area. Click on the image below to visit Utah's Division of Wildlife Resources website.



Pop up 4:

**Grand Staircase-Escalante National Monument**

The GSENM is comprised of immense sedimentary rock layers, canyons, plateaus, arches, and natural bridges. These features create the vast and austere landscape that defines this area. Click on the image below to go to the BLM's GSENM website.



Pop up 5:

**Grand Canyon National Park**

The GSENM is close to a variety of natural and protected areas, such as the Grand Canyon. This provides the BLM with an opportunity to apply a broad scale approach to its management decisions relating to adjacent land uses. Click on the image below to visit National Park Service's Grand Canyon National Park webpage.



Page 4

**Regional Trends: Current Terrestrial Intactness****READ IT**

Terrestrial Intactness is comprised of three key components:

- Vegetation (invasives, fire regime departure)
- Development (road, utility, urban area, agriculture, energy)
- Habitat Fragmentation

The COP REA **Current Terrestrial Landscape Intactness Logic Model** (as in the COP REA **report** and **appendices**) takes all these components into account. The results of this model were used to compare the terrestrial intactness within the GSENM to that within the overall COP Ecoregion.

**SEE IT**

Use the interactive map to the right to explore current terrestrial intactness. Look at:

- Current terrestrial intactness within the GSENM.
- Current terrestrial intactness outside of the GSENM, within the COP Ecoregion.

**DO IT**

- View the legend for the Current Terrestrial Intactness dataset to see the symbology color that corresponds to each level of intactness.
- Is the terrestrial intactness of the GSENM relatively more, less, or similar to the COP Ecoregion? Click on the ⓘ symbols on the map to find out.

Pop up 1:

**Areas of Lower Current Terrestrial Intactness**

Lower current terrestrial intactness is found around large cities and urban areas (i.e. Grand Junction, Farmington, Durango, etc) because large cities and urban areas typically correspond to a greater amount of anthropogenic disturbance. Click on the image below to view a graphical representation of the comparison between the COP and GSENM.

Pop up 2:

**Areas of Higher Current Terrestrial Intactness**

GSENM has relatively higher levels of current terrestrial intactness than the COP Ecoregion as a whole. The GSENM does not contain any large cities or urban areas. We can conclude that its relatively higher level of intactness is due to lower anthropogenic disturbance, not necessarily due to greater habitat quality. Click on the image below to view a graphical representation of the comparison between the two areas.

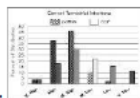


Image for both pop ups:

Page 5

**Regional Trends: Current Terrestrial Intactness: Vegetation Intactness and Development**

**READ IT**

Vegetation Intactness and Development datasets are inputs to the COP REA Current Terrestrial Landscape Intactness Logic Model (as in the COP REA report and appendices).

The Vegetation Intactness input includes data for:

- Invasive species (i.e. alien annual grasses, noxious weeds)
- Fire Regime Departure (current vegetation conditions compared to reference vegetation conditions)

Low density/presence of invasives and low fire regime departure equals high vegetation intactness

The Development input includes data for:

- Permanent Development (roads, utility line, pipeline, urban areas)
- Semi Permanent Development (agriculture, mining, geothermal, oil and gas)

Low permanent and low semi permanent development equals low development.

**SEE IT**

The interactive map to the right depicts areas of high to low invasives, fire regime departure, and development. This dataset has a scale dependency set on it, if you zoom out too far the data will not display.

Compare areas of high invasives, fire regime departure, and development to areas of low invasives, fire regime departure, and development. Use the graphic below to help understand the legend and color gradient between the two extremes.

**DO IT**

How does the high/low vegetation/development compare between the GSENM and COP Ecoregion? Click on the ⓘ symbols on the map to find out. This dataset has a scale dependency set on it, if you zoom out too far the data will not display.

Pop up 1 Text:

**High Fire Departure / Invasives / Development**

In contrast to the GSENM, the COP Ecoregion has relatively more areas of high fire regime departure, invasives, and development due to the large cities and urban areas (i.e. Grand Junction, Farmington, Durango, etc). Click on the image below to view a graphical representation of the comparison between the two areas.

Pop up 2 Text:

**Low Fire Departure / Invasives / Development**

The GSENM has relatively more areas with low fire regime departure, invasives, and development than the COP Ecoregion as a whole. This finding supports current management decisions within the area and can be used in future decisions. Click on the image below to view a graphical representation of the comparison between the two areas.

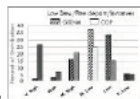


Image for both pop ups:

**Commented [HCE29]:** This term is very broad. Can you include a sentence about what inputs are, or how this input affects the COP, or how it informs land management decisions?

**Commented [MKH30R29]:** Maybe say "...are inputs (data used in the model)..."

**Commented [HCE31]:** "which means..."

**Commented [MKH32R31]:** "...high vegetation intactness, i.e., a high degree of naturalness."

Or is the comment about "Low density/presence of invasives..."? If so, could say "Low density/presence of invasives (few invasive plants)..."



**READ IT**

Habitat Fragmentation (habitat loss resulting in smaller, isolated patches of habitat) is an input to the **COP REA Current Terrestrial Landscape Intactness Logic Model** (as in the COP REA **report** and **appendices**). The Habitat Fragmentation input includes data for:

- Number of Patches
- Core Integrity (natural core area, nearest neighbor)

Low number of patches and high core integrity equals low habitat fragmentation.

**SEE IT**

The interactive map to the right depicts areas of high/low habitat fragmentation as a function of distance to anthropogenic features (cities, roads, etc). View the legend for the Habitat Fragmentation dataset and compare areas of high fragmentation to areas of low fragmentation.

**DO IT**

How does the high/low habitat fragmentation compare between the GSENM and COP Ecoregion? Click on the ⓘ symbols on the map to find out.

Pop up 1 Text:

**High Fragmentation**

The COP Ecoregion has areas of high habitat fragmentation around the large cities and urban areas (i.e. Grand Junction, Farmington, Durango, etc), but it also has areas of low habitat fragmentation, particularly in the western half of the ecoregion where there is less anthropogenic disturbance. Click on the image below to view a graphical representation of the comparison between the two areas.

Pop up 2 Text:

**Low Fragmentation**

The GSENM has minimal anthropogenic disturbance, resulting in low habitat fragmentation. This supports the claim that the GSENM is a key component of a large natural habitat connectivity block. Click on the image below to view a graphical representation of the comparison between the two areas.

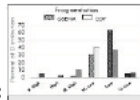


Image for both pop ups:

Commented [HCE33]: Great explanation!

Commented [HCE34]: (b)(5) DPP

Commented [HCE36]: Same comment as with the last graph!

Commented [MKH37R36]: Seems this would be difficult to read, given the size of the pop-up box. I suggest we edit the text in the box, above the graph.

Page 7

**Regional Trends: Habitat Connectivity****READ IT**

The COP REA (**report** and **appendices**) uses three datasets to analyze habitat connectivity:

- Natural Blocks (large natural landscape blocks used in corridor modeling)
- Sticks (lines between natural blocks used for corridor modeling)
- Least Cost Corridors (potential linkages between natural blocks)

This network of data was used to identify potential areas to be connected between natural blocks.

(b)(5) DPP

**SEE IT**

Use the interactive map to the right to explore habitat connectivity blocks and networks, which are hypothetical connections between the centroids of the habitat blocks. Look at areas with more habitat connectivity blocks compared to those with less habitat connectivity blocks.

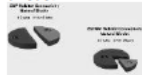
**DO IT**

- How is the habitat connectivity in the GSENM? How does its habitat connectivity affect the surrounding areas? Click on the ⓘ symbol within the GSENM boundary on the map to find out.
- How does the percentage of natural landscape blocks in the COP Ecoregion compare to the percentage within the GSENM? Click on the ⓘ symbol within the COP Ecoregion boundary on the map to find out.
- Turn on the layers for surface management, cities, and highways to see how that may affect habitat connectivity. To view the surface management layer better, you may need to turn off the Natural Blocks and Least Cost Corridors layers off (under Habitat Connectivity (Nested Layers) in the Layer List).

Pop up 1 Text:

**Habitat Connectivity in the COP Ecoregion Compared to GSENM**

The COP Ecoregion has lower habitat connectivity than the GSENM due to greater disturbance caused by large cities and urban areas, more roadways, and more private land. Most of the potential for habitat corridors is concentrated in the eastern third of the ecoregion where much of the human disturbance is located. Click on the image below to view a graphical comparison of habitat connectivity between the two areas.



Pop up 2 Text:

**Habitat Connectivity in the COP Ecoregion Compared to GSENM**

Compared to the GSENM, the COP Ecoregion has a lower percentage of habitat connectivity blocks due to greater anthropogenic disturbance caused by large cities and urban areas, more roadways, and more private land. Most of the potential for habitat corridors is concentrated in the eastern third of the ecoregion where much of the human disturbance is located. Click on the image below to view a graphical comparison of habitat connectivity between the two areas.



Page 8

**Regional Trends: Road Density****READ IT**

Anthropogenic features, such as cities and roads, can be analyzed at the broad scale to determine regional trends in road density. This trend can be correlated to the GSENM object and value of remoteness.

Commented [HCE40]: Any other word/phrase for this?

Commented [MKH41R40]: We could just say "center."

(b)(5) DPP

The ability to observe and quantify the presence or absence of roads provides an increased level of analysis and use for these data in making land management decisions.

#### SEE IT

The interactive map to the right depicts areas of high and low road density (averaged within 5<sup>th</sup> level HUC boundaries). View the legend for the Habitat Fragmentation dataset and compare areas of high road density to areas of low road density.

#### DO IT

How does the high/low road density compare between the GSENM and COP Ecoregion? Click on the ③ symbols on the map to find out.

Pop up 1 Text:

##### Higher Road Density

Higher road density is found along major roadways and in the vicinity of large cities and urban areas. Click on the image below to view a graphical representation of the comparison between the two areas.

Pop up 2 Text:

##### Lower Road Density

GSENM has relatively lower road density than the COP Ecoregion as a whole. Though GSENM does contain roads, it does not contain major roads, large cities or urban areas. We can conclude the GSENM's relatively lower road density reflects its remoteness (distance from major roads, large cities, and urban areas). Click on the image below to view a graphical representation of the comparison between the two areas.

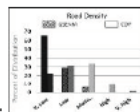


Image for both pop ups:

Page 9

#### Regional Trends: Sensitive Soils

#### READ IT

The COP REA report and appendices include analysis of soils related to:

- Sensitive Soils
- Potential Early Successional Soil Crust (% cover of biological crust including biocrust lichens, mosses and dark cyanobacteria)
- Potential Late Successional Soil Crust (% cover of biological crust including light cyanobacterial and some physical crust cover)

A benefit to these data is they can be field verified by going to locations and looking for the presence or absence of sensitive and/or successional soils. This ability provides an increased level of analysis and use for these data in making land management decisions.

#### SEE IT

Use the interactive map to the right to explore areas of sensitive soils. This dataset it has a scale dependency set on it, if you zoom out too far the data will not display.

**Commented [FAB53]:** Do we want to have roads turned on in the map by default?

**Commented [MKH54R53]:** I think so (unless it makes the map too busy).

**Commented [FAB55R53]:** Fixed. I also turned on cities because the Read It section and pop-ups mention them being a part of the correlation.

**Commented [HCE56]:** What does 5<sup>th</sup> level mean?

**Commented [MKH57R56]:** See explanation in comment below  
Maybe clearer to say "...road density averaged within watersheds (5<sup>th</sup> level HUCs)."

**Commented [HCE58]:** What does HUC stand for?

**Commented [MKH59R58]:** HUC = Hydrologic Unit Code. It refers to a system of classifying river basins and watersheds in the US. The system is a nested hierarchy of "hydrologic units," where the first (highest) level refers to regions (such as the Pacific Northwest), or entire river basins (such as the Missouri River), the second level to subregions, and so on, down to the smallest areas, or sixth level. "5<sup>th</sup> level HUCs" refers to "watersheds," with an average size of 227 sq. mi.

**Commented [HCE60]:** Good conclusion!

**Commented [HCE61]:** Add in a description of what "successional" means

**Commented [MKH62R61]:** Ecological succession refers to changes in biological communities over time that result in greater diversity of species and increased complexity of ecological systems (more paths for flow of materials and energy).

Maybe say:

"Early successional" refers to biocrust communities present in the early phases of ecological succession; "late successional" refers to those communities present in the later phases. Late successional biocrusts have greater species diversity and higher complexity. Although this is probably too long...

A shorter, simpler version:

"Early successional biocrusts are those that first colonize an area; late successional biocrusts are more diverse and complex communities."

**DO IT**

- What actions is the BLM taking to help protect sensitive soils? Click on the ⓘ symbol within the GSENM boundary on the map to find out.
- How does the percentage of area covered by sensitive soils in the COP Ecoregion compare to that of the GSENM? Click on the ⓘ symbol within the COP Ecoregion boundary on the map to find out.
- To view areas of potential early and late successional soil crust open the Layer List > check the box for "Soil Crusts (Nested Layers)" and expand to see Soil Crust sub layers > check the boxes for "Early Successional Soil Crust" or "Late Successional Soil Crust", depending on which you want to view. You will need to turn off the sensitive soils layer in order to view a soil crust layer completely.

**Pop up 1 Text:****Sensitive Soils in the COP Ecoregion Compared to GSENM**

The percentage of sensitive soils in the COP Ecoregion is relatively similar to the percentage of sensitive soils in the GSENM. Click on the image below to view a graphical representation of the comparison between the two areas.

**Pop up 2 Text:****GSENM Grazing Plan Amendment**

The BLM is working on an amendment to the original GSENM Grazing Plan that will provide updated direction for livestock grazing. Click on the image below for more information about this amendment on the BLM's website.

**READ IT**

Aside from using this data for a large scale analysis, we can also use the sensitive and successional soils data for more detailed analysis of smaller areas such as allotments.

#### SEE IT

Use the interactive map to the right to explore the three allotments in GSENM with the greatest percentage of area covered by high potential early (>51% cover) and late (>25% cover) successional soil crust. Look at the percentage of area of these allotments covered by high potential early and late successional soil crust.

#### DO IT

Click on the ⓘ symbols on the map to see what percentage of each allotment has high potential for early and late successional soil crust.

To view sensitive soils or areas of potential early and late successional soil crust open the Layer List and:

- For Sensitive Soils, check the box next to "Sensitive Soils (Scale Dependent)". This dataset has a scale dependency set on it, if you zoom out too far the data will not display.
- For areas of potential early and late successional soil crust, click on "Soil Crusts (Nested Layers)" > check the boxes next to "Soil Crusts (Nested Layers)" and "Early Successional Soil Crust" or "Late Successional Soil Crust", depending on which you want to view. You may need to turn off the sensitive soils layer in order to view a soil crust layer completely.



Pop up 1:

#### Dry Valley Grazing Allotment

55% of the Dry Valley grazing allotment has high potential for early and late successional soils.

Pop up 2:

#### Cockscomb Grazing Allotment

51% of the Cockscomb grazing allotment has high potential for early and late successional soils.

Pop up 3:

#### Coyote Grazing Allotment

56% of the Coyote grazing allotment has high potential for early and late successional soils.

Page 11

#### Conclusion

This Story Map has illustrated some potential ways in which we can apply landscape level data, such as that for the COP REA, to a smaller area, such as the GSENM.

Commented [MKH65R64]: Yes

Commented [FAB66R64]: Fixed.

Commented [HCE68]: Grazing allotments, right? Please specify.

Commented [MKH69R68]: Yes, grazing allotments. Change "allotments" to "grazing allotments."

Commented [FAB70]: broad scale data?

Commented [MKH71R70]: Let's say "multi-scale data" here.

Commented [FAB72R70]: Fixed.

Commented [HCE73R70]: How about large-scale?

The regional trends looked at by the COP REA could be applied to some of the GSENM Objects and Values to help in understanding why the monument was created, why it is unique, and

The current terrestrial intactness and its related components, show the GSENM has both a vast and austere landscape and is also rugged and remote.

The habitat connectivity and road density show how the GSENM is largely comprised of unspoiled natural areas which provides a suitable environment for diverse soils, wildlife habitat, and terrestrial ecosystems.

Data for susceptible biological resources, such as sensitive soils, is important to have when developing management plans, such as the GSENM Grazing Plan Amendment. Having this data available helps integrate multiple uses such as grazing, with protection of the objects and resources. For more insight to how the BLM uses large scale data to inform land management decisions, visit [our webpage for Planning and NEPA in the BLM](#).

Commented [HCE74]: Passive voice.

(b)(5) DPP