Rare Plant Conservation Planning Workshop Results

PAGOSA SPRINGS

Ipomopsis polyantha
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Ipomopsis polyantha habitat
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Plant Species of Focus

Pagosa skyrocket (*Ipomopsis polyantha*)

Sponsored by the
Colorado Rare Plant Conservation Initiative

June 12, 2008

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Kram, M., B. Neely, A.Oliver, and S. Panjabi. 2008. Rare Plant Conservation Planning Workshop: Pagosa Springs Priority Action Area. Prepared by The Nature Conservancy and the Colorado Natural Heritage Program. Unpublished report prepared for the National Fish and Wildlife Foundation.

I. Summary

This document identifies conservation strategies for Pagosa skyrocket, based on an assessment of the plant's viability and threats by participants of a June 2008 workshop. The primary audience is intended to be the workshop participants and other stakeholders interested in helping to implement the strategies.

The Pagosa skyrocket (*Ipomopsis polyantha)* is a rare plant endemic to the Pagosa Springs Priority Action Area as identified by the Colorado Rare Plant Conservation Initiative (RPCI). A Priority Action Area is an area needing immediate conservation action to prevent the need for listing, extinction, or further losses of imperiled plant species. Selection was based on the level of imperilment of rare plant species, quality of the occurrences, urgency of the management and protection actions, and other opportunities such as funding and land ownership patterns. These areas are based on the Potential Conservation Areas identified by the Colorado Natural Heritage Program, at Colorado State University, with input by the RPCI and the Rare Plant Technical Committee (RPTC).

Located primarily in Archuleta and Hinsdale counties, the Pagosa Springs Priority Action Area includes all known occurrences of the Pagosa skyrocket (*Ipomopsis polyantha;* G1, candidate for listing as endangered under the Endangered Species Act), as well as significant occurrences of two other globally imperiled (G2) plants: Pagosa bladderpod (*Lesquerella pruinosa*) and Gray's townsend daisy (*Townsendia glabella).* The focus of this document, Pagosa skyrocket, is an extremely rare plant – one of the most imperiled species in Colorado. The species is at risk of extinction due to its narrow range and the fact that its range overlaps with the town of Pagosa Springs and associated residential and commercial development.

Pagosa skyrocket is a robust herbaceous plant with small white-pink flowers in the Phlox family (Polemoniaceae). The species is particularly interesting because it is known only from small patches of habitat in the immediate vicinity of Pagosa Springs, and nowhere else in the world, despite extensive searches by area botanists over the past 25 years.

The known occurrences vary in condition from good to poor. No occurrences are thought to be in very good condition. The variation in condition is due in part to the number and severity of threats to the occurrences. For example, the occurrences are highly threatened by construction and maintenance of housing and urban development; road construction; and utility construction.

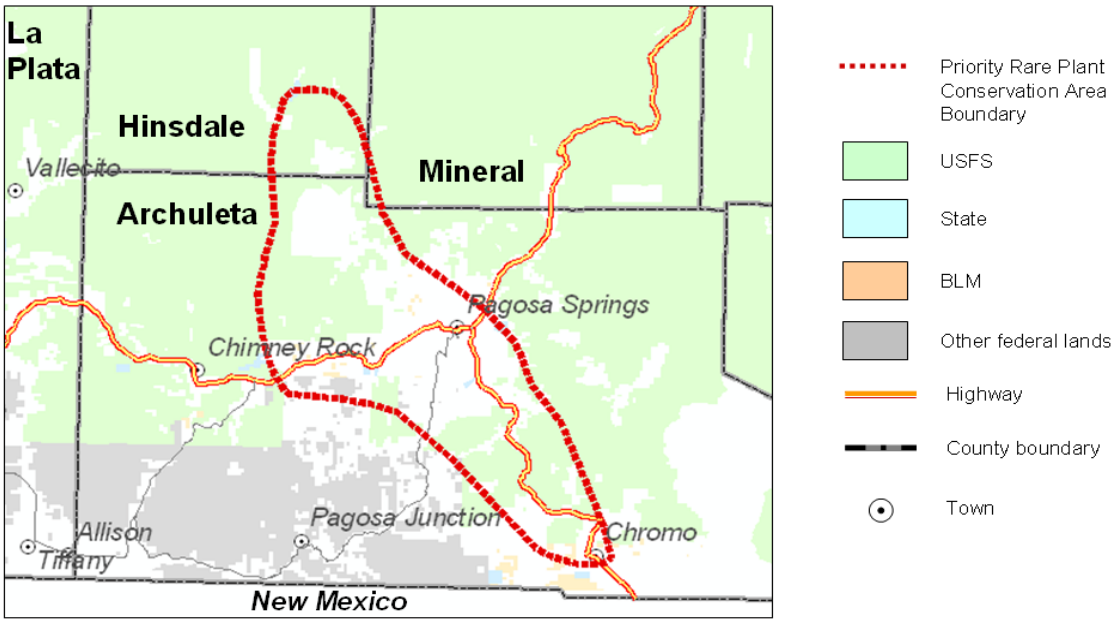
To abate these and other threats, participants of a June 2008 workshop identified and prioritized a variety of strategies; the high priority strategies are listed in the following page. See Attachment 2 for a full list of strategies. Workshop participants plan to meet every 6-12 months to assess progress toward the implementation of these strategies.

High priority strategies for conserving Pagosa skyrocket

Target Locations					
Site	**Owner/ manager**	**Strategy**	**Priority**	**Lead**	**Notes**
Strategies across all target locations					
All		Inform the town of Pagosa Spring's Master Plan, specifically by providing map overlays and making presentations to the county and town about the rare plants, particularly Pagosa skyrocket.	High	C. Karas, A. Oliver	1.5 years ago, FWS gave a presentation to county commissioners. **Town of Pagosa is currently revising its Master Plan.** The County may adopt the town's plan.
All		Develop Best Management Practices and share with landowners to reduce the likelihood of disturbance to Pagosa skyrocket on all lands.	High	J. Peterson, S. Panjabi	As of July, J. Peterson had prepared a draft
All		Conduct further inventories to increase knowledge of the location and status of the Pagosa skyrocket.	High	P.Lyon, E. Mayo. Sue willing to help.	Depends on landowner permission. Challenge - obtaining landowner permissions and/or finding out who to contact, especially with absentee landowners. Better soil and geology maps would be helpful.
All		Education: Create a Pagosa Springs Rare Plant Garden and interpretive information at Community Center, Visitor's Center, and/or museum to increase public awareness of rare plants.	High	Sue (w/help from C.Karas).	Talk w/Jim Miller
Strategies for specific target locations					
1, 3 large parcels		Identify potential conservation options for working with private landowners such as: Compensation for management agreement; access easement model; possibility of purchasing an easement on a portion of a parcel; sale by willing landowner/purchase by county or land trust.	High	A. Oliver, K. Freeman	No tax advantage to doing an easement; couldn't keep ag status. Are the 3 parcels subdividable? Already platted?
1, County garage	County	Talk with the County about the plants on this property to ensure avoidance of this target location.	High	P.Lyon	P. Lyon spoke with facility manager on June 13, 2008.
1, Fairgrounds		Discuss conservation or management options with the landowner at the Fairgrounds Board Meeting. Ideally any use or development could be designed to work for the landowner and for the rare plants.	High	A. Oliver to check on possible funding.	Last CNHP communication w/landowner indicated he was not happy with rare plant situation 6/11/07. Consider attempting to obtain access agreement for monitoring. Can the plant area be an asset to the landowners? Management lease?
1, Fairgrounds		Inform town master plan, so that it is conducive to preserving the plant (County talking about adopting it)	High	A.Oliver to contact town, w/possible assistance from C.Karas	Town contact: Tamara Allen. Consider going thru Parks and Recreation too.

II. Map

All known occurrences of the Pagosa skyrocket and most of the Colorado occurrences of the Pagosa bladderpod and Gray's townsend daisy lie within the Pagosa Priority Rare Plant Conservation Area, shown below.



III. Pagosa Springs Park Priority Action Area and Associated Rare Plants

This document focuses on rare plants within the Pagosa Springs Priority Action Area as identified by the Colorado Rare Plant Conservation Initiative (RPCI). To date, RPCI has identified seven such areas across Colorado. A Priority Action Area is an area needing immediate conservation action to prevent the need for listing, extinction, or further losses of imperiled plant species. Selection was based on the level of imperilment of rare plant species, quality of the occurrences, urgency of the management and protection actions, and other opportunities such as funding and land ownership patterns. These areas are based on the Potential Conservation Areas identified by the Colorado Natural Heritage Program, at Colorado State University, with input by the RPCI and the Rare Plant Technical Committee (RPTC).

Located primarily in Archuleta and Hinsdale counties, the Pagosa Springs Priority Action Area includes all known occurrences of the Pagosa skyrocket (*Ipomopsis polyantha;* G1, candidate for listing as endangered under the Endangered Species Act).

Table 1. Globally imperiled plants known from the Pagosa Springs Priority Action Area.

Common name	Scientific name	Known occurrences	Global rank*	Status	CNHP Rare Plant Field Guide Link
Focus of the workshop and this document					
Pagosa gilia; Pagosa skyrocket	*Ipomopsis polyantha*	3 in the world, all of which are in the Pagosa area.	G1	Candidate for listing on the federal Endangered species list	CNHP Rare Plant Field Guide http://www.cnhp.colostate.edu/rareplants/PDPLM060C0.html
Other important rare plants – focus of future efforts					
Pagosa bladderpod; frosty bladderpod	*Lesquerella pruinosa*	18 in the world, 17 of which are in Colorado, with most of these in the Pagosa Priority Action Area.	G2	BLM and FS sensitive	CNHP Rare Plant Field Guide http://www.cnhp.colostate.edu/rareplants/PDBRA1N1D0.html
Gray's townsend daisy	*Townsendia glabella*	21 in the world, 13 of which are in Colorado, with several in the Pagosa area.	G2	None	Not included in guide.

*G1 = critically imperiled. G2 = imperiled. For more detail on global ranks please visit the Colorado Natural Heritage Program's website at http://www.cnhp.colostate.edu/heritage.html.

Pagosa skyrocket is a robust herbaceous plant with small white-pink flowers in the Phlox family (Polemoniaceae). The species is particularly interesting because it is only known from the immediate vicinity of Pagosa Springs, and nowhere else in the world, despite extensive searches by area botanists over the past 25 years.

The Mancos Shale habitat of the target locations is primarily threatened by construction and maintenance of housing and urban development; road construction; and utility construction.

Although the focus of the workshop was on the globally imperiled plants, Attachment 1 describes other significant species and plant communities in this area. A full suite of biodiversity values should be considered during more expansive conservation planning efforts for this area.

IV. About the Workshop

Purpose: To identify strategies for conserving the Pagosa skyrocket, based on an assessment of the viability of and threats to its occurrences.

Origin: The Rare Plant Conservation Initiative (RCPI) is a diverse partnership of public and private organizations dedicated to conserving Colorado's natural heritage by improving the protection and stewardship of the state's most important plants. RPCI is developing a strategy for the conservation of Colorado's most imperiled plant species. As part of this effort, the group is working with partners to identify statewide and site-specific strategies in areas with (a) the most imperiled species, and (b) a reasonable likelihood of conservation success. For site-specific strategies, RCPI partners identified five priority action areas around the state: Arkansas Valley

Barrens, Middle Park, North Park, Pagosa Springs, and the Piceance Basin. For each of these areas, RCPI led a workshop during the summer of 2008 with local partners to identify priority conservation strategies.

Workshop date: June 12, 2008

Participants:

Name	Affiliation
Attended	
Sara Brinton	USFS, Pagosa District
Tony Cady	Colorado Dept. of Transportation, Pagosa
Suzanne Coe	Contractor, LPEA
Karin Freeman	Southwest Land Alliance
Sandy Friedley	Colorado Native Plant Society
Susan Halabrin	Audubon Society, Weminuche Chapter
Chrissy Karas	Archuleta County, Planning Commissioner
Megan Kram (co-facilitator)	The Nature Conservancy
Peggy Lyon	Colorado Natural Heritage Program
Ellen Mayo	USFWS
Ann Oliver (CPRI point of contact)	The Nature Conservancy
Susan Panjabi (co-facilitator)	Colorado Natural Heritage Program
Unable to attend	
Tamra Allen	Town of Pagosa
Lesli Allison	Archuleta County Planning Commissioner
Jim Behnken	Consultant for LPEA
Becky Gillette	Audubon Society, Weminuche Chapter
Charlie King	Colorado Native Plant Society
Jim Miller	Town of Pagosa
Dick Mosely	Colorado Native Plant Society
Joe Nigg	Town of Pagosa, Associate Director Planning
William Nobles	CSU Extension
Jeff Peterson	Colorado Department of Transportation
Jeff Redders	USFS
Al Schneider	Colorado Native Plant Society
Michael Whiting	Southwest Land Alliance
Steve Whiteman	Southern Ute Tribe
Other contacts	
Steve O'Kane	
Ken Heil	
Julie Korb	
	Fort Lewis College
	Garden Clubs
	Town Parks and Recreation

V. Workshop Results

A. Conservation Targets

Using the The Nature Conservancy's (TNC) site conservation planning workshop methodology, "conservation targets" are a limited suite of species, communities, and/or ecological systems, or specific locations of these elements of biodiversity (e.g., occurrences, sub-occurrences, or other areas) that are the basis for setting goals, identifying conservation strategies, and measuring conservation effectiveness.

At the Pagosa Springs Priority Action Area our targets are specific locations of the rare plants. Specifically, we organized the three occurrences of the Pagosa skyrocket, as identified by CNHP, into ten target locations based on landownership (Table 2). We initially considered using the three occurrences as a whole as targets, but decided that it would be more meaningful to identify the viability, threats, and strategies for sub-occurrences (target locations within the occurrence boundaries) of the two larger occurrences. The sub-occurrences were delineated for this purpose based primarily on patterns of landownership, since different patterns can lead to different strategies. For instance, voluntary conservation easements are more likely to be useful tools for conserving large private land parcels than small parcels.

The three occurrences of Pagosa skyrocket are included within two "Potential Conservations Area" as identified by the Colorado Natural Heritage Program (Table 2). A PCA represents CNHP biologists' best estimate of the primary area required to support the long-term survival of species or communities of interest or concern.

Table 2. Element occurrences and target locations for each occurrence of Pagosa Skyrocket.

Occurrence number and survey site name (PCA name in parentheses)	**Target locations based on occurrences or sub-occurrences**	**Land owner/manager**
EO#1 – Pagosa Springs (Mill Creek at Pagosa Springs)	Ipomopsis 1a: Road 84	Private and County Road
	Ipomopsis 1b: Road Tierro Del Oro	Private and right of way
	Ipomopsis 1c: Hwy 119	Private and CDOT
	Ipomopsis 1d: Fairgrounds	County and private?
	Ipomopsis 1e: County Garage	County
	Ipomopsis 1f: 3 large parcels	Private
	Ipomopsis 1g: Holiday Acres	Private
EO# 3 - Dyke (Stollsteimer Creek North).	Ipomopsis 3a - Dyke (Stollsteimer Creek North) – larger polygon	BLM and private
	Ipomopsis 3b - Dyke (Stollsteimer Creek North) – smaller polygon	BLM and private
EO# 4, Mill Creek (Mill Creek at Pagosa Springs- east arm of polygon)	Ipomopsis 4	private

CNHP assigns each occurrence a unique number, an element occurrence number. These numbers are not necessarily in consecutive order because as new locations of plants are found,

some occurrences are lumped together, and locations previously documented as two or more occurrences may become one (e.g., if plants are found between two occurrences, they may all together be considered one occurrence because of the proximity and connectedness of the individual plants).

B. Viability

"Viability" per TNC terminology is the "health" or "functionality" of the conservation targets. During the Workshop we attempted to answer two key questions through the viability assessment: *How do we define 'health' (viability) for each of our targets?* and *What is the current status of each of our targets?*

Table 3 shows the viability for each occurrence as a whole as previously identified by the Colorado Natural Heritage Program (CNHP). Table 5 shows a more detailed assessment of viability for the target locations. As Table 5 indicates, no target locations are ranked as *very good*, but a handful are ranked as *good*: Fairgrounds, county garage, 3 large parcels, and Dyke (Stollsteimer Creek North) – smaller polygon.

Table 3. Viability of the known occurrences of the Pagosa skyrocket

Occurrence number	Survey site name and PCA name	Viability Rank	Acres
1	Pagosa Springs (Mill Creek at Pagosa Springs)	B = Good	563
3	Dyke (Stollsteimer Creek North)	B = Good	58
4	Mill Creek (Mill Creek at Pagosa Springs)	C = Fair	1.74

* CNHP assigns a rank to each occurrence using the following codes: A = Very good; B = good; C = fair; D = poor; H = possibly extirpated/ possibly extinct; X presumed extirpated/presumed extinct

The viability ranking of for each occurrence were based on a systematic assessment of the components of viability, or indicators and associated indicator ratings as shown in the table below. These components of viability were "rolled up" into the overall viability rank.

Table 4. Basis for viability ratings.

		Indicator rating criteria			
Key Attribute	Indicator	**D** - Poor	**C** - Fair	**B** - Good	**A** - Very Good
LANDSCAPE CONTEXT: Intactness of occurrence and surrounding area	% fragmentation	Highly fragmented	Moderately fragmented	Limited fragmentation	Unfragmented
CONDITION: Population structure & recruitment	Evidence of reproduction	Little or no evidence of successful repro. (few seedlings	Less productive, but still viable with evidence of	Good likelihood of long-term viability as evidenced by flowering,	Excellent viability as evidenced by high % flowering and

		Indicator rating criteria			
Key Attribute	Indicator	**D** - Poor	**C** - Fair	**B** - Good	**A** - Very Good
		and/or no flowering or fruiting)	flowering and/or fruiting and mixed age classes	fruiting, and mixed age classes.	fruiting, and mixed age classes
CONDITION: Species composition / dominance	Evidence of reproduction	>50% cover	11-50% cover	1-10% cover	<1% cover
SIZE: Population size & dynamics	# individuals	<10	10-99	100-999	1,000 or more

Participants used the table above to rank each target location. The facilitators loaded participants' input into an Excel worbook, which summarized the input as shown below.

Table 5. Viability for target locations of Pagosa skyrocket

	Inputs to the overall viability rank				
Conservation Targets	**Landscape Context (Setting)**	**Condition**	**Size**		**Overall viability rank**
P. Skyrocket 1 – Pagosa Springs (Mill Creek at Pagosa Springs), Overall occurrence	Poor	Fair	Very Good		**Fair = C**
P. Skyrocket 1a: Road 84	Poor	Poor	Very Good		**Fair = C**
P. Skyrocket 1b: Road Tierro Del Oro	Poor	Poor	Poor		**Poor = D**
P. Skyrocket 1c: Road 119	Poor	Fair	Very Good		**Fair = C**
P. Skyrocket 1d: Fairgrounds	Good	Good	Very Good		**Good = B**
P. Skyrocket 1e: County Garage	Good	Good	Good		**Good = B**
P. Skyrocket 1f: 3 large parcels	Good	Good	Good		**Good = B**
P. Skyrocket 1g: Holiday Acres	Poor	Fair	Good		**Fair = C**
P. Skyrocket 3a - Dyke (Stollsteimer Creek North) – larger polygon	Poor	Fair	Good		**Fair = C**

	Inputs to the overall viability rank				
Conservation Targets	**Landscape Context (Setting)**	**Condition**	**Size**		**Overall viability rank**
P. Skyrocket 3b - Dyke (Stollsteimer Creek North) – smaller polygon	Fair	Good	Good		**Good = B**
P. Skyrocket 4 - Mill Creek (Mill Creek at Pagosa Springs), small polygon in east arm of PCA	Fair	Fair	Good		**Fair = C**

C. Threats

With the viability analysis complete, participants then identified the primary threats to each site. They identified and ranked threats based on their expertise, local knowledge, and sense of the key issues facing each target (Table 6). Identifying and ranking threats is an important input, along with understanding viability, to ultimately identifying efficient and effective strategies.

The variance in viability of the target locations in explained in part by the number and severity of threats to these locations. The locations are primarily threatened by construction and maintenance of housing and urban development; road construction; and utility construction.

Table 6. Primary threats to each target location. Red = high, orange = medium; yellow = low.

Target Locations	**Housing and urban areas - construction**	**Housing and urban areas – maint./use**	**Invasive non-natives**	**Road construction**	**Road maintenance**	**Utility construction**	**Utility maintenance**
P. Skyrocket 1 suboccurrences							
Road 1 - 84	Low		Med	High	Med	High	Med
Road 2 - TDO	High		Med	Med	High		
Road 3 - 119				High		High	
Fairgrounds	High						
County Garage			Low				
3 large parcels		High					
Holiday Acres		High					
P. Skyrocket 3a - Dyke (Stollsteimer Creek North) – larger polygon			Med	High	Med	High	?
P. Skyrocket 3b - Dyke (Stollsteimer Creek North) – smaller polygon				Med			Med
P. Skyrocket 4 - Mill Creek (Mill Creek at Pagosa Springs)		Med					

D. Strategies

Based on an understanding of viability and threats, participants identified strategies (a) across all target locations for Pagosa skyrocket and (b) for specific target locations. After brainstorming strategies, participants prioritized them as high, medium, or low based on their anticipated effectiveness. See p. 4 for a list of high priority strategies and Attachment 2 for a list of all strategies. Specific to private land protection efforts, the RPCI is also evaluating opportunities to work with willing private landowners and local land trusts to conserve these species and their habitats using voluntary tools such as conservation easements.

VI. Next Steps

The group plans to meet again in June 2009 to gauge progress toward strategies. Ann Oliver from TNC/RPI offered to coordinate this meeting. The meeting may also be a good opportunity to delve into strategies for conserving high-ranked occurrences of the other two key rare plant species in the area – *Townsendia glabella* and *Lesquerella pruinosa.*

Ellen Mayo, USFWS, informed the participants that she is working on a listing package to list the species as either Threatened or Endangered.

Attachment 1. Additional key species and plant communities in the Pagosa Springs area

Although the focus of the workshop was on the globally imperiled plants, other key species and plant communities are known from the Pagosa Springs area as shown in the table below (Colorado Natural Heritage Program 2008, http://www.cnhp.colostate.edu/). Specifically, the table identifies rare species and rare and/or high quality examples of plant communities in the Pagosa Springs area. These and other biodiversity values should be considered with more detailed planning efforts for this area.

Scientific name	Common name	Global rank	State rank	Major group
Bufo boreas	Boreal Toad (Southern Rocky Mountain Population)	G4T1Q	S1	Amphibians
Cypseloides niger	Black Swift	G4	S3B	Birds
Dendroica graciae	Grace's Warbler	G5	S3B	Birds
Falco peregrinus anatum	American Peregrine Falcon	G4T4	S2B	Birds
Haliaeetus leucocephalus	Bald Eagle	G5	S1B,S3N	Birds
Melanerpes lewis	Lewis's Woodpecker	G4	S4	Birds
Speyeria nokomis nokomis	Great Basin Silverspot Butterfly	G3T1	S1	Insects
Cynomys gunnisoni	Gunnison's Prairie Dog	G5	S5	Mammals
Abies concolor - Picea pungens - Populus angustifolia / Acer glabrum Forest	Montane Riparian Forests	G2	S2	Natural Communities
Abies lasiocarpa / Alnus incana Forest	Montane Riparian Forests	G5	S5	Natural Communities
Abies lasiocarpa / Erigeron eximius Forest	Subalpine Forests	G5	S4	Natural Communities
Abies lasiocarpa / Mertensia ciliata Forest	Montane Riparian Forests	G5	S5	Natural Communities
Abies lasiocarpa / Vaccinium myrtillus Forest	Subalpine Forests	G5	S5	Natural Communities
Acer negundo - Populus angustifolia / Cornus sericea Forest	Narrowleaf Cottonwood Riparian Forests	G2	S2	Natural Communities
Alnus incana - Salix (monticola, lucida, ligulifolia) Shrubland	Thinleaf Alder-Mixed Willow Species	G3	S3	Natural Communities
Alnus incana - Salix drummondiana Shrubland	Montane Riparian Shrubland	G3	S3	Natural Communities
Alnus incana / Mesic Forbs Shrubland	Thinleaf Alder/Mesic Forb Riparian Shrubland	G3	S3	Natural Communities
Caltha leptosepala Herbaceous Vegetation	Montane Wet Meadows	G4	S4	Natural Communities

Scientific name	Common name	Global rank	State rank	Major group
Cardamine cordifolia - Mertensia ciliata Herbaceous Vegetation	Alpine Wetlands	G4	S4	Natural Communities
Carex aquatilis - Carex utriculata Herbaceous Vegetation	Montane Wet Meadows	G4	S4	Natural Communities
Carex atherodes Herbaceous Vegetation		G3G5	S2?	Natural Communities
Carex pellita Herbaceous Vegetation	Montane Wet Meadows	G3	S3	Natural Communities
Carex utriculata Herbaceous Vegetation	Beaked Sedge Montane Wet Meadows	G5	S4	Natural Communities
Danthonia parryi Herbaceous Vegetation	Montane Grasslands	G3	S3	Natural Communities
Eleocharis quinqueflora Herbaceous Vegetation	Alpine Wetlands	G4	S3S4	Natural Communities
Festuca arizonica - Muhlenbergia montana Herbaceous Vegetation	Montane Grasslands	G3	S2	Natural Communities
Picea pungens / Alnus incana Woodland	Montane Riparian Forests	G3	S3	Natural Communities
Populus angustifolia - Juniperus scopulorum Woodland	Montane Riparian Forest	G2G3	S2S3	Natural Communities
Populus angustifolia - Picea pungens / Alnus incana Woodland	Montane Riparian Forests	G3	S3	Natural Communities
Populus angustifolia - Pseudotsuga menziesii Woodland	Montane Riparian Forest	G3	S2	Natural Communities
Populus angustifolia / Alnus incana Woodland	Montane Riparian Forest	G3	S3	Natural Communities
Populus angustifolia / Salix (monticola, drummondiana, lucida) Woodland	Narrowleaf Cottonwood/Mixed Willows Montane Riparian Forest	G3	S3	Natural Communities
Populus angustifolia / Salix exigua Woodland	Narrowleaf Cottonwood Riparian Forests	G4	S4	Natural Communities
Populus angustifolia / Salix irrorata Woodland	Foothills Riparian Woodland	G2	S2	Natural Communities
Populus angustifolia / Salix ligulifolia - Shepherdia argentea Woodland	Narrowleaf Cottonwood Riparian Forests	G1	S3	Natural Communities
Pseudotsuga menziesii / Cornus sericea Woodland	Lower Montane Riparian Forests	G4	S2	Natural Communities
Salix bebbiana Shrubland	Montane Willow Carrs	G3?	S2	Natural Communities
Salix drummondiana / Mesic Forbs Shrubland	Drummonds Willow/Mesic Forb	G4	S4	Natural Communities

Scientific name	Common name	Global rank	State rank	Major group
Salix monticola / Mesic Forbs Shrubland	Montane Riparian Willow Carr	G4	S3	Natural Communities
Shepherdia argentea Shrubland	Foothills Riparian Shrubland	G3G4	S1	Natural Communities
Astragalus missouriensis var. *humistratus*	Missouri milkvetch	G5T1	S1	Vascular Plants
Astragalus proximus	Aztec milkvetch	G4	S2	Vascular Plants
Botrychium echo	reflected moonwort	G3	S3	Vascular Plants
Carex retrorsa	retrorse sedge	G5	S1	Vascular Plants
Castilleja lineata	marsh-meadow indian-paintbrush	G4?	S1	Vascular Plants
Cryptogramma stelleri	slender rock-brake	G5	S2	Vascular Plants
Draba smithii	Smith whitlow-grass	G2	S2	Vascular Plants
Hippochaete variegata	variegated scouringrush	G5	S1	Vascular Plants
Lesquerella pruinosa	Pagosa bladderpod	G2	S2	Vascular Plants
Phlox caryophylla	Pagosa phlox	G4	S3	Vascular Plants
Polypodium hesperium	western polypody	G5	S1S2	Vascular Plants
Polypodium saximontanum	Rocky Mountain Polypody	G3?	S3?	Vascular Plants
Townsendia glabella	Gray's townsend-daisy	G2	S2	Vascular Plants
Viola pedatifida	prairie violet	G5	S2	Vascular Plants
Woodsia neomexicana	New Mexico cliff fern	G4?	S2	Vascular Plants

For more information about these and other biodiversity values, see reports including but not limited to the following:

- Colorado Wildlife Action Plan http://wildlife.state.co.us/WildlifeSpecies/ColoradoWildlifeActionPlan/
- The Nature Conservancy Ecoregional Assessments. http://conserveonline.org/workspaces/cbdgateway/era/reports/index_html The Southern Rocky Mountains Ecoregional Assessment pertains to the Pagosa Springs Priority Action Area.
- Southern Rockies Ecosystem Project: http://www.restoretherockies.org/reports.html

Attachment 2. Full list of strategies for Pagosa skyrocket

The strategies below are organized in priority order of area → target owner/manager → priority, with priority 1 being highest, 2 being secondary, and 3 being a lower priority.

Target locations					
Occurrence or suboccurrence	**Owner/ manager**	**Strategy**	**Priority**	**Lead**	**Notes**
Strategies across all target occurrences					
All		Inform the town of Pagosa Spring's Master Plan, specificaylly by providing map overlays and making presentations to the county and town about the rare plants, particularly Pagosa skyrocket.	High	C. Karas, A. Oliver	1.5 years ago, FWS gave a presentation to county commissioners. **Town of Pagosa is currently revising its Master Plan.** The County may adopt the town's plan.
All		Develop Best Management Practices and share with landowners to reduce the likelihood of disturbance to Pagosa skyrocket on all lands.	High	J. Peterson, S. Panjabi	As of July, J. Peterson had prepared a draft
All		Conduct further inventories to increase knowledge of the location and status of the Pagosa skyrocket.	High	P.Lyon, E. Mayo. Sue willing to help.	Depends on landowner permission. Challenge - obtaining landowner permissions and/or finding out who to contact, especially with absentee landowners. Better soil and geology maps would be helpful.
All		Education: Create a Pagosa Springs Rare Plant Garden and interpretive information at Community Center, Visitor's Center, and/or museum to increase public awareness of rare plants.	High	Sue (w/help from C.Karas).	Talk w/Jim Miller
All		Education: Informational brochure at Chamber of Commerce or Extension	Medium		
All		Conduct long-term monitoring.	Low		
All		Conduct research on transplanting	Low		Transplanting has been tested but success is not yet proven (S. Coe, S. Brinton).
All		Contact NRCS to update status of soil surveys for Archuleta County	Low	S. Friedley	Highly unlikely
All		Create a tax/other monetary benefit for smaller landowners who protect biological values - involve CNAP, talk with	Low		

Target locations					
Occurrence or suboccurrence	**Owner/ manager**	**Strategy**	**Priority**	**Lead**	**Notes**
		County			
All		Develop research protocol	Low		
All		Discuss possibility of town and/or county holding open space and maintaining open space priorities if not already identified.	Low		
All		Education: Rare plant talk for Audubon	Low		
All		Education: Schools (field trips, help with surveys, etc.)	Low		
All		Recognize landowners/ land managers for special protection of the rare plants.	Low		
All		Work with FWS to move forward with listing of the species	Low		
Strategies for specific target occurrences					
1, 3 large parcels		Identify potential conservation options for working with private landowners such as: Compensation for management agreement; access easement model; possibility of purchasing an easement on a portion of a parcel; sale by willing landowner/purchase by county or land trust.	High	A. Oliver, K. Freeman	No tax advantage to doing an easement; couldn't keep ag status. Are the 3 parcels subdividable? Already platted?
1, County garage	County	Talk with the County about the plants on this property to ensure avoidance of this target location.	High	P.Lyon	P. Lyon spoke with facility manager on June 13, 2008.
1, Fairgrounds		Discuss conservation or management options with the landowner at the Fairgrounds Board Meeting. Ideally any use or development could be designed to work for the landowner and for the rare plants.	High	A. Oliver to check on possible funding.	Last CNHP communication w/landowner indicated he was not happy with rare plant situation 6/11/07. [can we rephrase?] Consider attempting to obtain access agreement for monitoring. Can the plant area be an asset to the landowners? Management lease?
1, Fairgrounds		Inform town master plan, so that it is conducive to preserving the plant (County talking about adopting it)	High	A.Oliver to contact town, w/possible assistance	Town contact: Tamra Allen. Consider going thru Parks and Recreation too.

Target locations					
Occurrence or suboccurrence	**Owner/ manager**	**Strategy**	**Priority**	**Lead**	**Notes**
				from C.Karas	
1, Holiday Acres		Present to Homeowner's Association about rare plants and BMPs in the neighborhood	Med	C.Karas	Annual meeting in August or Sept.
3b, Dyke		Fence parcel	Med	S.Brinton	
3b, Dyke		Long-term monitoring - one of few places in natural condition.	Low	S.Brinton	
Roadside – all 3 roadside occurrences		Placquarding system for roadsides	Med	T.Cady	