

Supplemental Table 1. The populations of *S. dawsoniae*, *S. glaucus*, *S. parviflorus*, *S. brevispinus*, and *S. wetlandicus* from Colorado and Utah sampled for this study. The state, county, and number of individuals (N) are recorded. Region is recorded for populations of *S. glaucus* in order to define management units for the species.

	State	County	Region	Population	N
<i>S. dawsoniae</i>	Colorado	Garfield	North	Mile Post 68	4
	Colorado	Garfield	North	Red Hill	7
	Colorado	Mesa	North	Atwell Gulch	25
	Colorado	Mesa	North	Sunnyside	2
	Colorado	Mesa	North	Pyramid Rock	9
	Colorado	Mesa	North	South Shale Ridge	14
	Colorado	Mesa	North	Sulphur Gulch	2
	Colorado	Mesa	North	Winter Flats	12
<i>S. glaucus</i>	Colorado	Mesa	Grand Valley	18 Rd	2
	Colorado	Mesa	Grand Valley	Upper Billings	6
	Colorado	Mesa	Grand Valley	Reeder Mesa	6
	Colorado	Mesa	Grand Valley	Horse Mountain	11
	Colorado	Mesa	Grand Valley	Stage Coach Trail	10
	Colorado	Delta	Gunnison River	Dominguez Canyon	8
	Colorado	Delta	Gunnison River	Picnic Site	12
	Colorado	Delta	Gunnison River	Cactus Park	11
	Colorado	Delta	Gunnison River	Raven's Nest	2
	Colorado	Delta	Gunnison River	Adobe Hills	7
<i>S. parviflorus</i>	Colorado	Mesa		King's Estate	2
	Colorado	Mesa		Niche Runway	1
	Colorado	Mesa		North of Loma	1
	Colorado	Mesa		Rabbit Valley	2
	Utah	Duchesne		Starvation Reservoir	2
	Utah	San Juan		La Sal	2
	New Mexico	San Juan		North of Kirtland	2
	New Mexico	San Juan		Shiprock	2
	New Mexico	San Juan		South of Shiprock	1
<i>S. brevispinus</i>	Utah	Uintah		Disappointment Ridge	2
	Utah	Uintah		Dude Young	2
	Utah	Uintah		Leeland Bench	3
	Utah	Uintah		Uteland Butte	2
	Utah	Uintah		West Pariette Draw	2
	Utah	Uintah		Felters	2
	Utah	Uintah		East Pariette Draw	2
	Utah	Uintah		Hilltop	2
	Utah	Uintah		Pariette Bench	2
<i>S. wetlandicus</i>	Utah	Carbon		9 mile Canyon	2
	Utah	Uintah		Chapita Grove	2
	Utah	Uintah		Dugway Hill	1
	Utah	Uintah		East Bonanza	3
	Utah	Uintah		Mountain Fuel Bridge	2

	Utah	Uintah		Ouray	2
	Utah	Uintah		Pond	2
	Utah	Uintah		South 4 mile Flat	2
	Utah	Uintah		West Bonanza	2
	Utah	Uintah		Wild Horse Bench	2
	Utah	Uintah		Willow Creek	2
	Utah	Uintah		Wyasket Bottom	2

Supplementary Table 2. FastStructure mean Q values for K=2. Group 1 corresponds to *S. glaucus* genotypes. Group 2 corresponds to *S. dawsoniae* genotypes. All samples with more than 0.05% admixture are in bold.

Individual	Species	Population	Group 1	Group 2
GRSCGL_AdobeHill_19	SCGL	Adobe Hills	0.9997	0.0003
GRSCGL_AdobeHills_18	SCGL	Adobe Hills	0.9997	0.0003
GRSCGL_AdobeHills_21	SCGL	Adobe Hills	0.9996	0.0004
GRSCGL_AdobeHills_22	SCGL	Adobe Hills	0.9996	0.0004
GRSCGL_AdobeHills_23	SCGL	Adobe Hills	0.9994	0.0006
GRSCGL_AdobeHills_27	SCGL	Adobe Hills	0.9996	0.0004
GRSCGL_AdobeHills_28	SCGL	Adobe Hills	0.9997	0.0003
GRSCGL_CactusPark_1	SCGL	Cactus Park	0.9997	0.0003
GRSCGL_CactusPark_2	SCGL	Cactus Park	0.9997	0.0003
GRSCGL_CactusPark_22	SCGL	Cactus Park	0.9993	0.0007
GRSCGL_CactusPark_23	SCGL	Cactus Park	0.9998	0.0002
GRSCGL_CactusPark_24	SCGL	Cactus Park	0.9997	0.0003
GRSCGL_CactusPark_25	SCGL	Cactus Park	0.9998	0.0003
GRSCGL_CactusPark_26	SCGL	Cactus Park	0.9997	0.0003
GRSCGL_CactusPark_27	SCGL	Cactus Park	0.9997	0.0003
GRSCGL_CactusPark_29	SCGL	Cactus Park	0.9997	0.0003
GRSCGL_CactusPark_3	SCGL	Cactus Park	0.9998	0.0002
GRSCGL_CactusPark_5	SCGL	Cactus Park	0.9997	0.0003
GRSCGL_DominguezCanyon_1	SCGL	Dominguez Canyon	0.9997	0.0003
GRSCGL_DominguezCanyon_15	SCGL	Dominguez Canyon	0.9997	0.0003
GRSCGL_DominguezCanyon_17	SCGL	Dominguez Canyon	0.9997	0.0003
GRSCGL_DominguezCanyon_21	SCGL	Dominguez Canyon	0.9991	0.0009
GRSCGL_DominguezCanyon_22	SCGL	Dominguez Canyon	0.9997	0.0003
GRSCGL_DominguezCanyon_5	SCGL	Dominguez Canyon	0.9997	0.0003
GRSCGL_DominguezCanyon_8	SCGL	Dominguez Canyon	0.9996	0.0004
GRSCGL_DominguezCanyon_9	SCGL	Dominguez Canyon	0.9998	0.0002
GRSCGL_PicnicSite_10	SCGL	Picnic Site	0.9998	0.0002
GRSCGL_PicnicSite_11	SCGL	Picnic Site	0.9998	0.0002
GRSCGL_PicnicSite_13	SCGL	Picnic Site	0.9998	0.0002
GRSCGL_PicnicSite_17	SCGL	Picnic Site	0.9997	0.0003
GRSCGL_PicnicSite_18	SCGL	Picnic Site	0.9997	0.0003
GRSCGL_PicnicSite_20	SCGL	Picnic Site	0.9998	0.0002
GRSCGL_PicnicSite_22	SCGL	Picnic Site	0.9997	0.0003
GRSCGL_PicnicSite_5	SCGL	Picnic Site	0.9996	0.0004

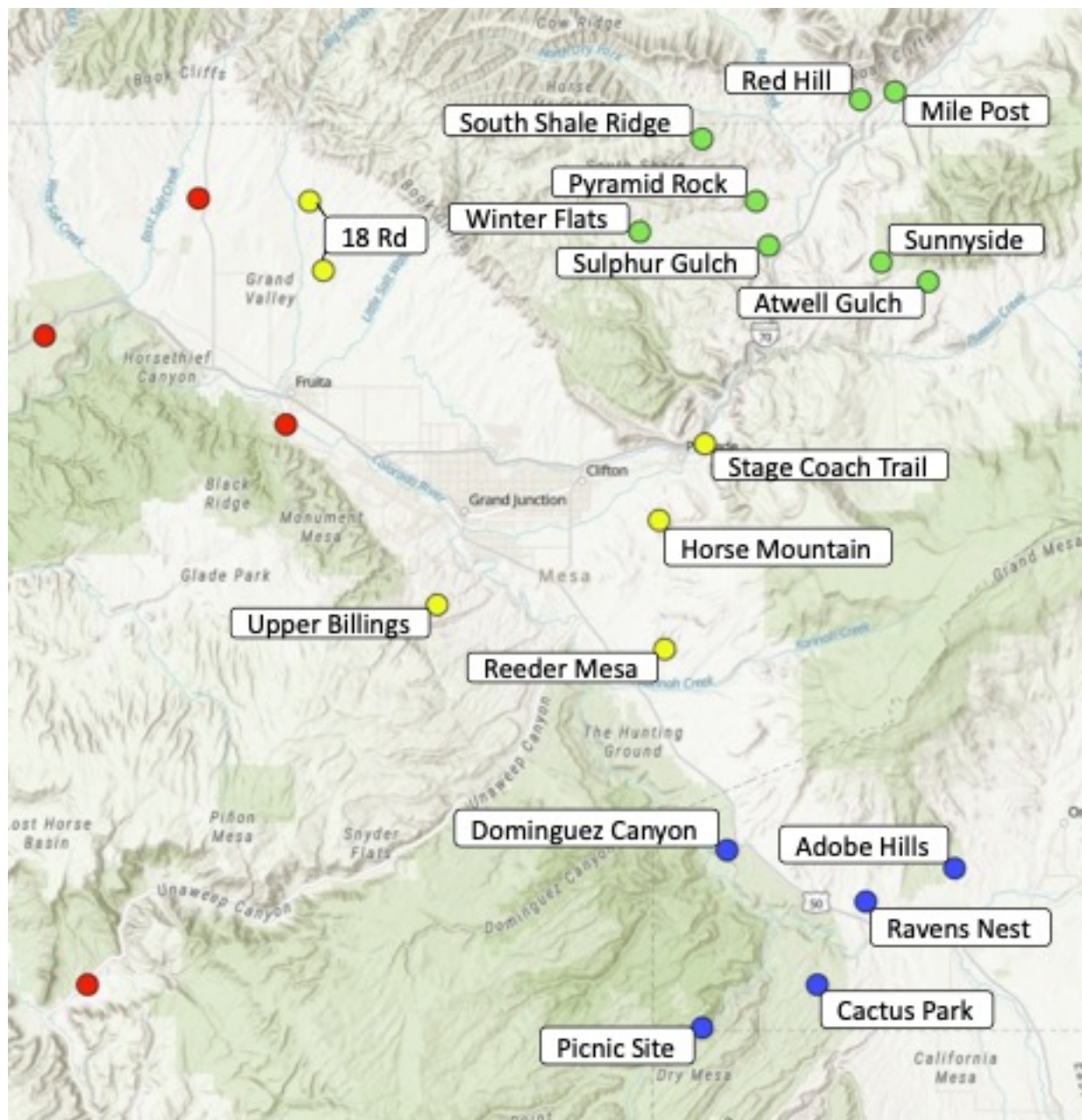
GRSCGL_PicnicSite_6	SCGL	Picnic Site	0.9998	0.0002
GRSCGL_PicnicSite_7	SCGL	Picnic Site	0.9997	0.0003
GRSCGL_PicnicSite_8	SCGL	Picnic Site	0.9997	0.0003
GRSCGL_PicnicSite_9	SCGL	Picnic Site	0.9997	0.0003
GRSCGL_RavensNest_12	SCGL	Raven's Nest	0.9997	0.0003
GRSCGL_RavensNest_26	SCGL	Raven's Nest	0.9973	0.0027
GVSCGL_18RDE_1	SCGL	18 Rd	0.9963	0.0037
GVSCGL_18RDW_3	SCGL	18 Rd	0.9670	0.0330
GVSCGL_HorseMountain_16	SCGL	Horse Mountain	0.9997	0.0003
GVSCGL_HorseMountain_17	SCGL	Horse Mountain	0.9991	0.0009
GVSCGL_HorseMountain_19	SCGL	Horse Mountain	0.9996	0.0004
GVSCGL_HorseMountain_20	SCGL	Horse Mountain	0.9272	0.0728
GVSCGL_HorseMountain_21	SCGL	Horse Mountain	0.9727	0.0273
GVSCGL_HorseMountain_23	SCGL	Horse Mountain	0.9509	0.0491
GVSCGL_HorseMountain_24	SCGL	Horse Mountain	0.9822	0.0178
GVSCGL_HorseMountain_26	SCGL	Horse Mountain	0.9451	0.0549
GVSCGL_HorseMountain_27	SCGL	Horse Mountain	0.9714	0.0286
GVSCGL_HorseMountain_29	SCGL	Horse Mountain	0.9684	0.0316
GVSCGL_HorseMountain_30	SCGL	Horse Mountain	0.9637	0.0363
GVSCGL_ReaderMesa_1	SCGL	Reeder Mesa	0.9996	0.0004
GVSCGL_ReaderMesa_12	SCGL	Reeder Mesa	0.9996	0.0004
GVSCGL_ReaderMesa_17	SCGL	Reeder Mesa	0.9996	0.0004
GVSCGL_ReaderMesa_18	SCGL	Reeder Mesa	0.9997	0.0003
GVSCGL_ReaderMesa_23	SCGL	Reeder Mesa	0.9996	0.0004
GVSCGL_ReaderMesa_27	SCGL	Reeder Mesa	0.9994	0.0006
GVSCGL_StagecoachTrail_12	SCGL	Stage Coach Trail	0.9232	0.0768
GVSCGL_StagecoachTrail_13	SCGL	Stage Coach Trail	0.9736	0.0264
GVSCGL_StagecoachTrail_14	SCGL	Stage Coach Trail	0.9646	0.0354
GVSCGL_StagecoachTrail_25	SCGL	Stage Coach Trail	0.9540	0.0460
GVSCGL_StagecoachTrail_26	SCGL	Stage Coach Trail	0.9997	0.0003
GVSCGL_StagecoachTrail_3	SCGL	Stage Coach Trail	0.9980	0.0020
GVSCGL_StagecoachTrail_4	SCGL	Stage Coach Trail	0.9226	0.0774
GVSCGL_StagecoachTrail_5	SCGL	Stage Coach Trail	0.9863	0.0137
GVSCGL_StagecoachTrail_7	SCGL	Stage Coach Trail	0.9997	0.0003
GVSCGL_StagecoachTrail_8	SCGL	Stage Coach Trail	0.9813	0.0187
GVSCGL_UB_10	SCGL	Upper Billings	0.9997	0.0003
GVSCGL_UB_23	SCGL	Upper Billings	0.9953	0.0047
GVSCGL_UB_27	SCGL	Upper Billings	0.9996	0.0004
GVSCGL_UB_3	SCGL	Upper Billings	0.9996	0.0004

GVSCGL_UB_5	SCGL	Upper Billings	0.9997	0.0003
GVSCGL_UB_7	SCGL	Upper Billings	0.9996	0.0004
SCDA_AtwellGulch2_1	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch2_11	SCDA	Atwell Gulch	0.0002	0.9998
SCDA_AtwellGulch2_13	SCDA	Atwell Gulch	0.0002	0.9998
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SCDA_AtwellGulch2_27	SCDA	Atwell Gulch	0.0002	0.9998
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SCDA_AtwellGulch2_30	SCDA	Atwell Gulch	0.0002	0.9998
SCDA_AtwellGulch2_31	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch2_5	SCDA	Atwell Gulch	0.0005	0.9995
SCDA_AtwellGulch_10	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch_16	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch_19	SCDA	Atwell Gulch	0.0005	0.9995
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SCDA_AtwellGulch_21	SCDA	Atwell Gulch	0.0002	0.9998
SCDA_AtwellGulch_24	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch_25	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch_26	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch_28	SCDA	Atwell Gulch	0.0003	0.9997
SCDA_AtwellGulch_6	SCDA	Atwell Gulch	0.0004	0.9996
SCDA_AtwellGulch_8	SCDA	Atwell Gulch	0.0006	0.9994
SCDA_MP68_12	SCDA	Mile Post 68	0.0004	0.9996
SCDA_MP68_20	SCDA	Mile Post 68	0.0002	0.9998
SCDA_MP68_6	SCDA	Mile Post 68	0.0003	0.9997
SCDA_MP68_9	SCDA	Mile Post 68	0.0002	0.9998
SCDA_PyramidRock_1	SCDA	Pyramid Rock	0.0002	0.9998
SCDA_PyramidRock_10	SCDA	Pyramid Rock	0.0005	0.9995
SCDA_PyramidRock_11	SCDA	Pyramid Rock	0.0005	0.9995
SCDA_PyramidRock_12	SCDA	Pyramid Rock	0.0004	0.9996
SCDA_PyramidRock_16	SCDA	Pyramid Rock	0.0004	0.9996
SCDA_PyramidRock_18	SCDA	Pyramid Rock	0.0003	0.9997
SCDA_PyramidRock_22	SCDA	Pyramid Rock	0.0004	0.9996
SCDA_PyramidRock_24	SCDA	Pyramid Rock	0.0004	0.9996

SCDA_PyramidRock_5	SCDA	Pyramid Rock	0.0002	0.9998
SCDA_RedHills_11	SCDA	Red Hill	0.0003	0.9997
SCDA_RedHills_14	SCDA	Red Hill	0.0002	0.9998
SCDA_RedHills_2	SCDA	Red Hill	0.0003	0.9997
SCDA_RedHills_26	SCDA	Red Hill	0.0003	0.9997
SCDA_RedHills_27	SCDA	Red Hill	0.0004	0.9996
SCDA_RedHills_5	SCDA	Red Hill	0.0003	0.9997
SCDA_RedHills_9	SCDA	Red Hill	0.0003	0.9997
SCDA_SSR_1	SCDA	South Shale Ridge	0.0003	0.9997
SCDA_SSR_10	SCDA	South Shale Ridge	0.0002	0.9998
SCDA_SSR_14	SCDA	South Shale Ridge	0.0001	0.9999
SCDA_SSR_15	SCDA	South Shale Ridge	0.0002	0.9998
SCDA_SSR_16	SCDA	South Shale Ridge	0.0002	0.9998
SCDA_SSR_17	SCDA	South Shale Ridge	0.0002	0.9998
SCDA_SSR_19	SCDA	South Shale Ridge	0.0003	0.9997
SCDA_SSR_2	SCDA	South Shale Ridge	0.0002	0.9998
SCDA_SSR_21	SCDA	South Shale Ridge	0.0005	0.9995
SCDA_SSR_23	SCDA	South Shale Ridge	0.0002	0.9998
SCDA_SSR_3	SCDA	South Shale Ridge	0.0003	0.9997
SCDA_SSR_5	SCDA	South Shale Ridge	0.0004	0.9996
SCDA_SSR_6	SCDA	South Shale Ridge	0.0003	0.9997
SCDA_SSR_8	SCDA	South Shale Ridge	0.0002	0.9998
SCDA_SulphurGulch_4	SCDA	Sulphur Gulch	0.0004	0.9996
SCDA_SulphurGulch_5	SCDA	Sulphur Gulch	0.0003	0.9997
SCDA_SunnySide_1	SCDA	Sunnyside	0.0004	0.9996
SCDA_SunnySide_2	SCDA	Sunnyside	0.0002	0.9998
SCDA_WinterFlats_12	SCDA	Winter Flats	0.0009	0.9991
SCDA_WinterFlats_14	SCDA	Winter Flats	0.0003	0.9997
SCDA_WinterFlats_16	SCDA	Winter Flats	0.0003	0.9997
SCDA_WinterFlats_19	SCDA	Winter Flats	0.0002	0.9998
SCDA_WinterFlats_21	SCDA	Winter Flats	0.0293	0.9707
SCDA_WinterFlats_23	SCDA	Winter Flats	0.0002	0.9998
SCDA_WinterFlats_24	SCDA	Winter Flats	0.0003	0.9997
SCDA_WinterFlats_3	SCDA	Winter Flats	0.0003	0.9997
SCDA_WinterFlats_30	SCDA	Winter Flats	0.0593	0.9408
SCDA_WinterFlats_31	SCDA	Winter Flats	0.0004	0.9996
SCDA_WinterFlats_4	SCDA	Winter Flats	0.0003	0.9997
SCDA_WinterFlats_5	SCDA	Winter Flats	0.0005	0.9995

Supplemental Table 3. Pairwise matrix of genetic distance (Fst) among populations of *S. dawsoniae* and *S. glaucus*. Only populations with 6 or more samples were included. Group abbreviations are: SCGL GR = *S. glaucus* Gunnison River; SCGL GV = *S. glaucus* Grand Valley; SCDA = *S. dawsoniae*.

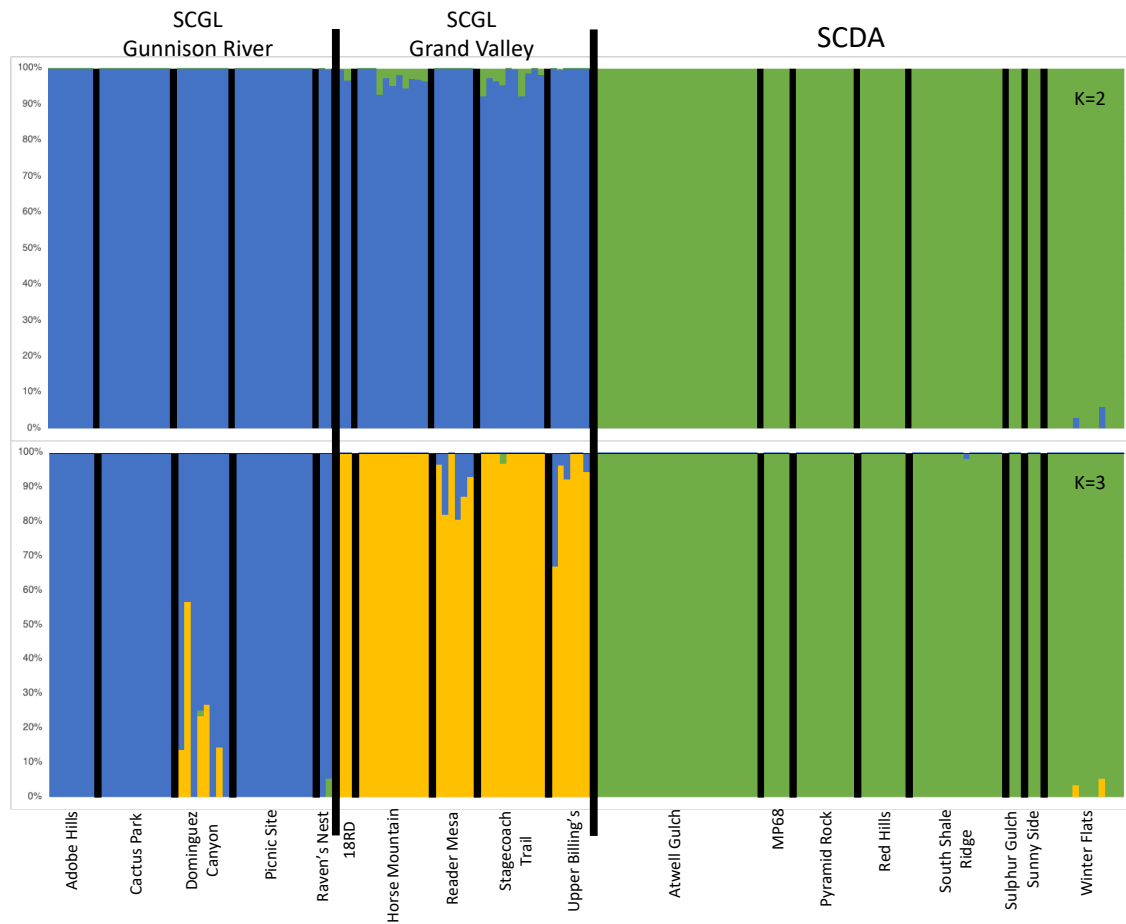
		SCGL-GR	SCGL-GR	SCGL-GR	SCGL-GR	SCGL-GV	SCGL-GV	SCGL-GV	SCGL-GV	SCDA	SCDA	SCDA	SCDA	SCDA
		Adobe Hill	Cactus Park	Dominguez Canyon	Picnic Site	Stagecoach Trail	Reader Mesa	Horse Mountain	UB	Atwell Gulch	Pyramid Rock	Red Hills	SSR	Winter Flats
SCGL-GR	Adobe Hill	0.000												
SCGL-GR	Cactus Park	0.011	0.000											
SCGL-GR	Dominguez Canyon	0.080	0.073	0.000										
SCGL-GR	Picnic Site	0.063	0.063	0.129	0.000									
SCGL-GV	Stagecoach Trail	0.186	0.187	0.161	0.250	0.000								
SCGL-GV	Reader Mesa	0.116	0.058	0.053	0.144	0.088	0.000							
SCGL-GV	Horse Mountain	0.142	0.174	0.118	0.217	0.052	0.031	0.000						
SCGL-GV	UB	0.120	0.078	0.040	0.141	0.097	-0.006	0.066	0.000					
SCDA	Atwell Gulch	0.340	0.370	0.367	0.402	0.378	0.337	0.359	0.351	0.000				
SCDA	Pyramid Rock	0.357	0.323	0.362	0.381	0.388	0.379	0.348	0.339	0.151	0.000			
SCDA	Red Hills	0.399	0.359	0.364	0.408	0.379	0.380	0.340	0.347	0.157	0.174	0.000		
SCDA	SSR	0.312	0.362	0.354	0.388	0.359	0.316	0.345	0.321	0.145	0.013	0.068	0.000	
SCDA	Winter Flats	0.336	0.326	0.344	0.368	0.345	0.317	0.329	0.335	0.173	0.074	0.149	0.064	0.000



Supplemental Figure 1. Population sampling of *S. dawsoniae* (green), *S. glaucus* (yellow and blue), and *S. parviflorus* (red) in Colorado. Populations included in population level analyses are labeled and color-coded by their genetic grouping: Blue – *S. glaucus* Gunnison River; Yellow – *S. glaucus* Grand Valley; Green – *S. dawsoniae*. Red – *S. parviflorus*.



Supplemental Figure 2. Maximum Likelihood phylogenetic tree for the Population Structure data set. Individual samples are color coded by species and region: Blue – *Sclerocactus glaucus* – Gunnison River; Yellow – *Sclerocactus glaucus* – Grand Valley ; Green – *S. dawsoniae* (formerly known as *S. glaucus* – North); Bootstrap values are indicated above branches.



Supplemental Figure 3. FastStructure Analysis of K=2 and K=3 of the population structure dataset. K=2 was the most statistically supported number of genetic groups, and splits *Sclerocactus glaucus* (blue) and *Sclerocactus dawsoniae* (green) into two genetic groups. K=3 was the second most supported number of genetic groups, and splits *Sclerocactus dawsoniae* and *Sclerocactus glaucus*. *Sclerocactus glaucus* is further separated into two regional groups – Gunnison River (blue) and Grand Valley (yellow).