

# THE 1983 LANDSAT SOIL-GAS GEOCHEMICAL SURVEY OF PATRICK DRAW AREA, SWEETWATER COUNTY, WYOMING

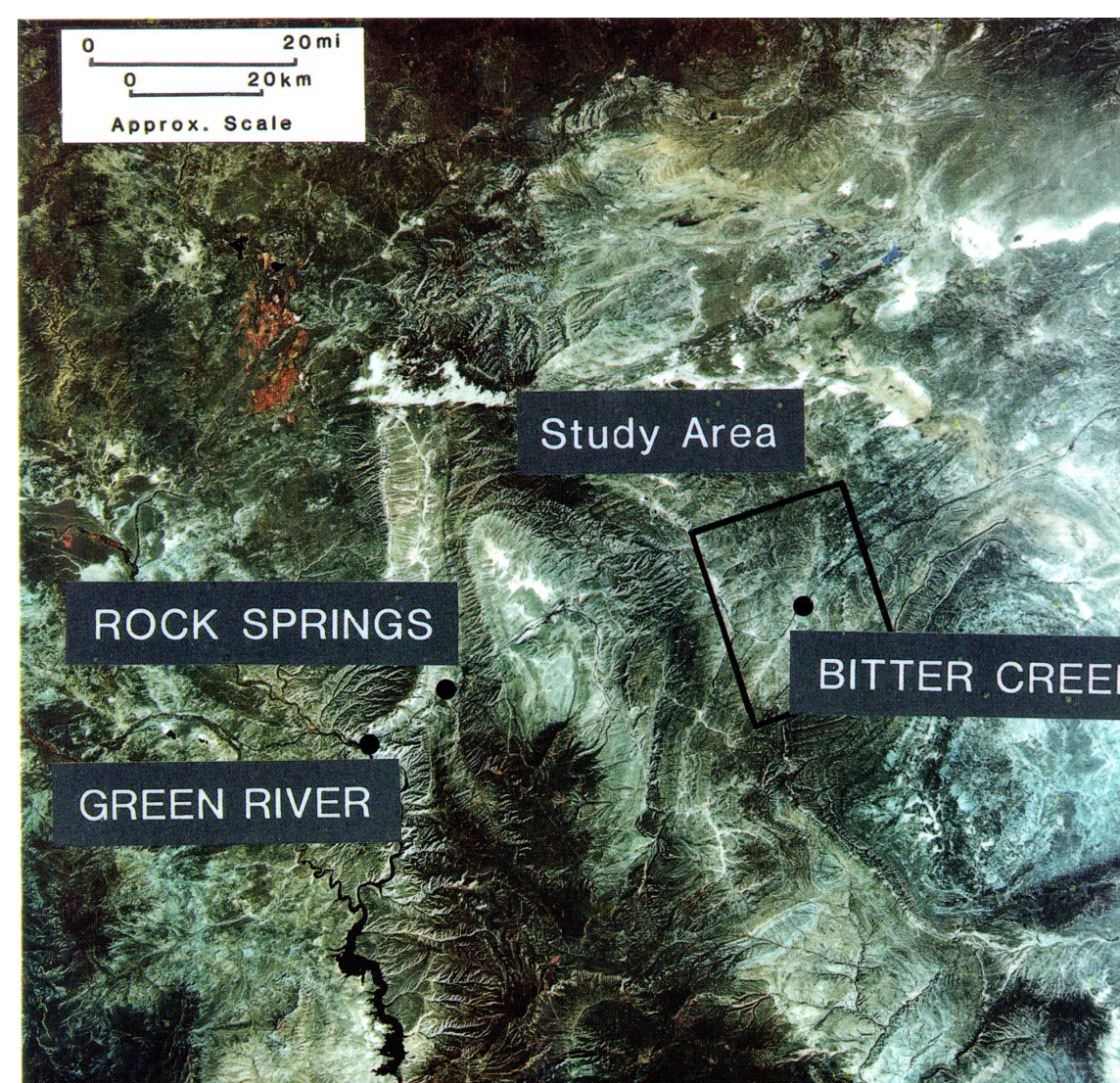
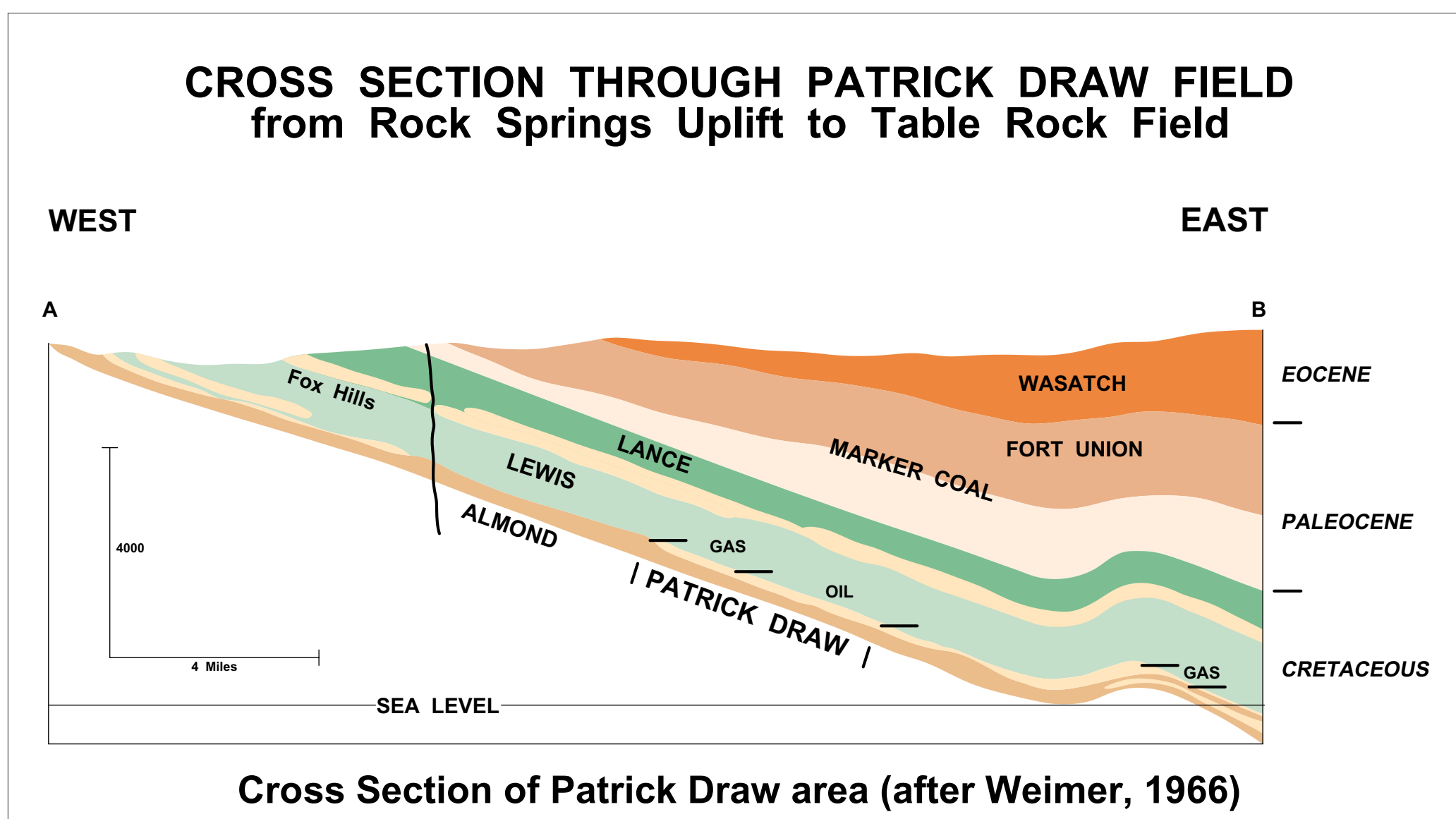
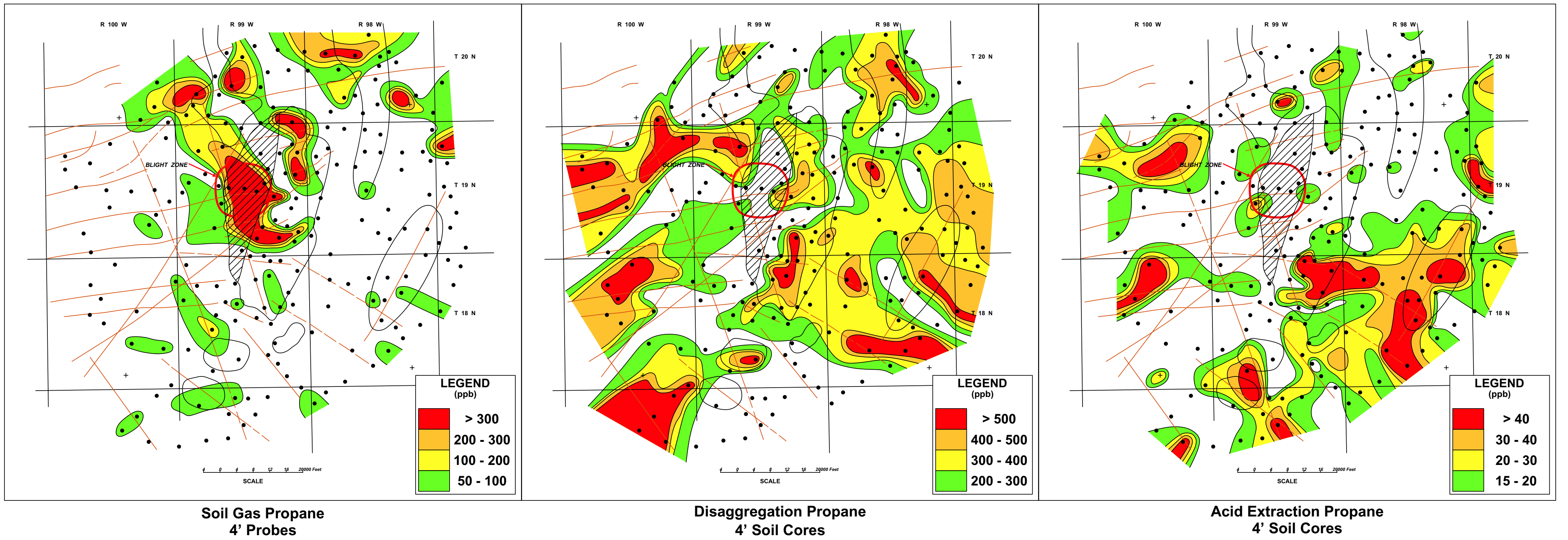
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## ABSTRACT

The Geosat test site at Patrick Draw, Wyoming, was resampled during the summer field season of 1983, to conduct a more detailed soil-gas survey on and around the area's producing fields. The results of this study agree with the 1980 Geosat assessment that the faults and fractures visible as linear features on satellite and aircraft imagery provide paths for active microseepage of hydrocarbons from depth to the near surface. This association is particularly true near the earlier described "blighted sage zone," where extensive resampling reveals a much wider area of anomalously high free soil-gas values and fluorescence than was previously reported. Discriminant analysis suggests that the geochemical seepage signature found over the fields differs statistically from that present for adjacent areas of no known production.

High hydrocarbon values in shallow free soil gas correlate well with fluorescence and appear to define areas of high production potential with direct anomalies.

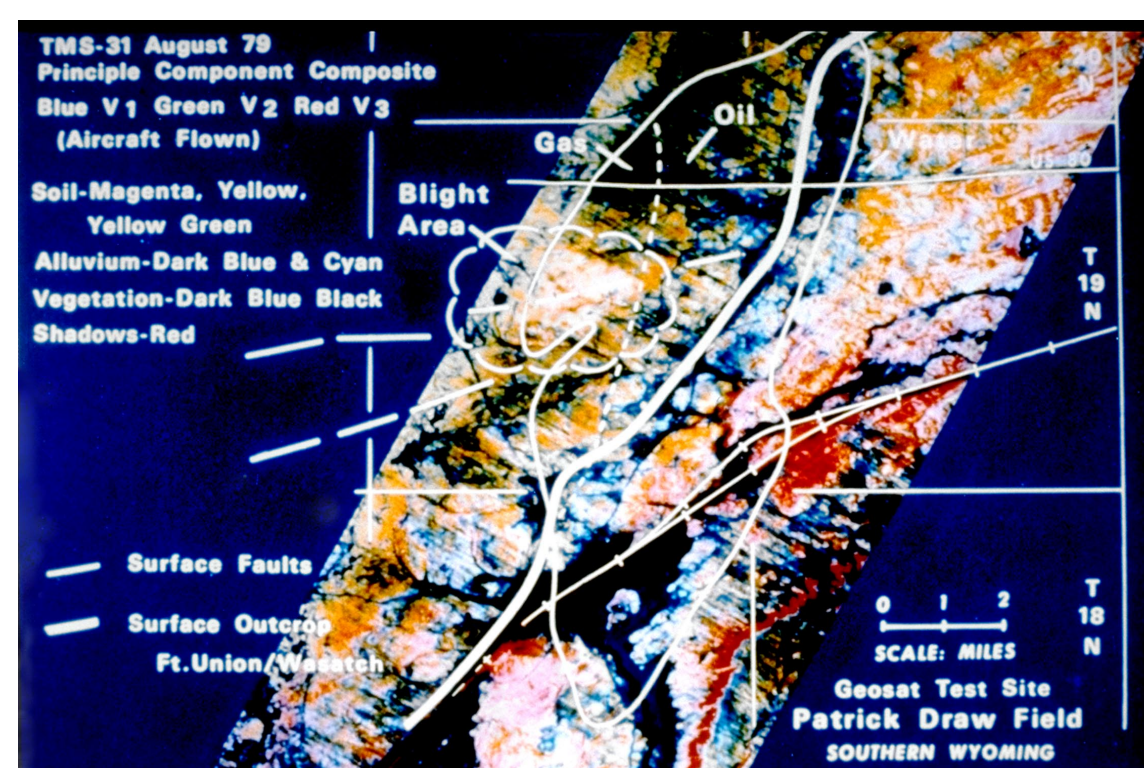
The free gas microseeps confirm the presence of a macroseep that appears to be adversely affecting the sage foliage.



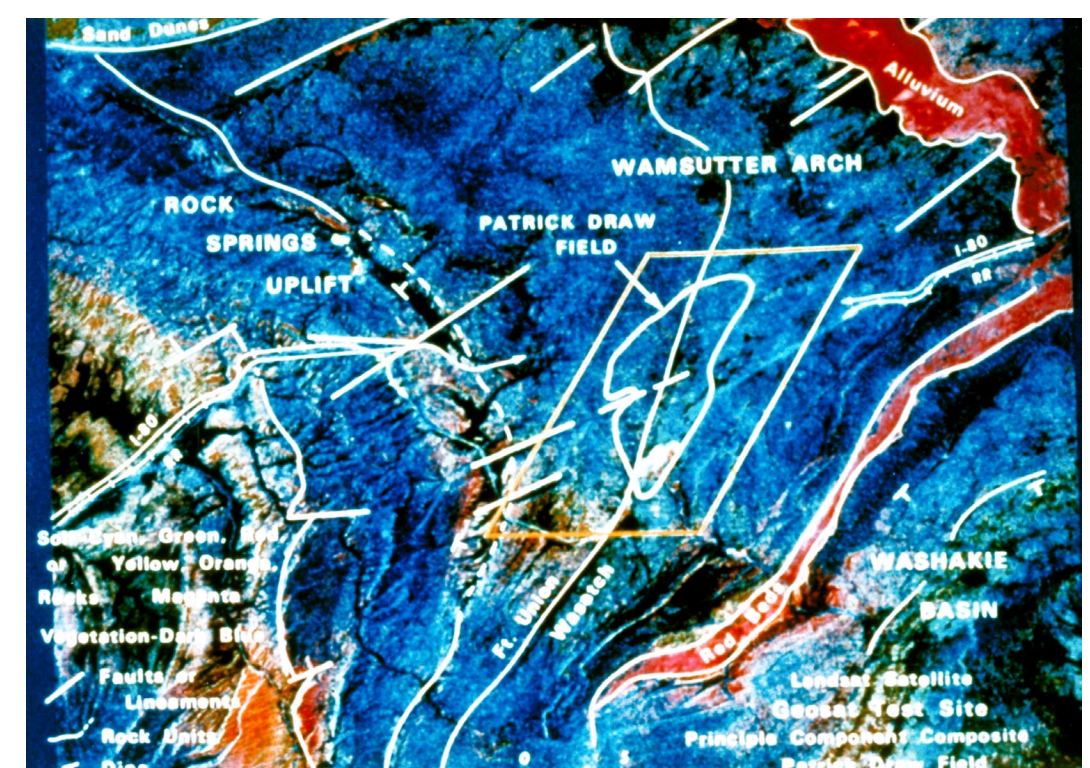
False color composite Landsat Multispectral Scanner Image, Rock Springs-Patrick Draw, southwestern Wyoming

Principal component color composite of full Landsat scene of southwestern Wyoming showing the Patrick Draw test site. (See picture below)

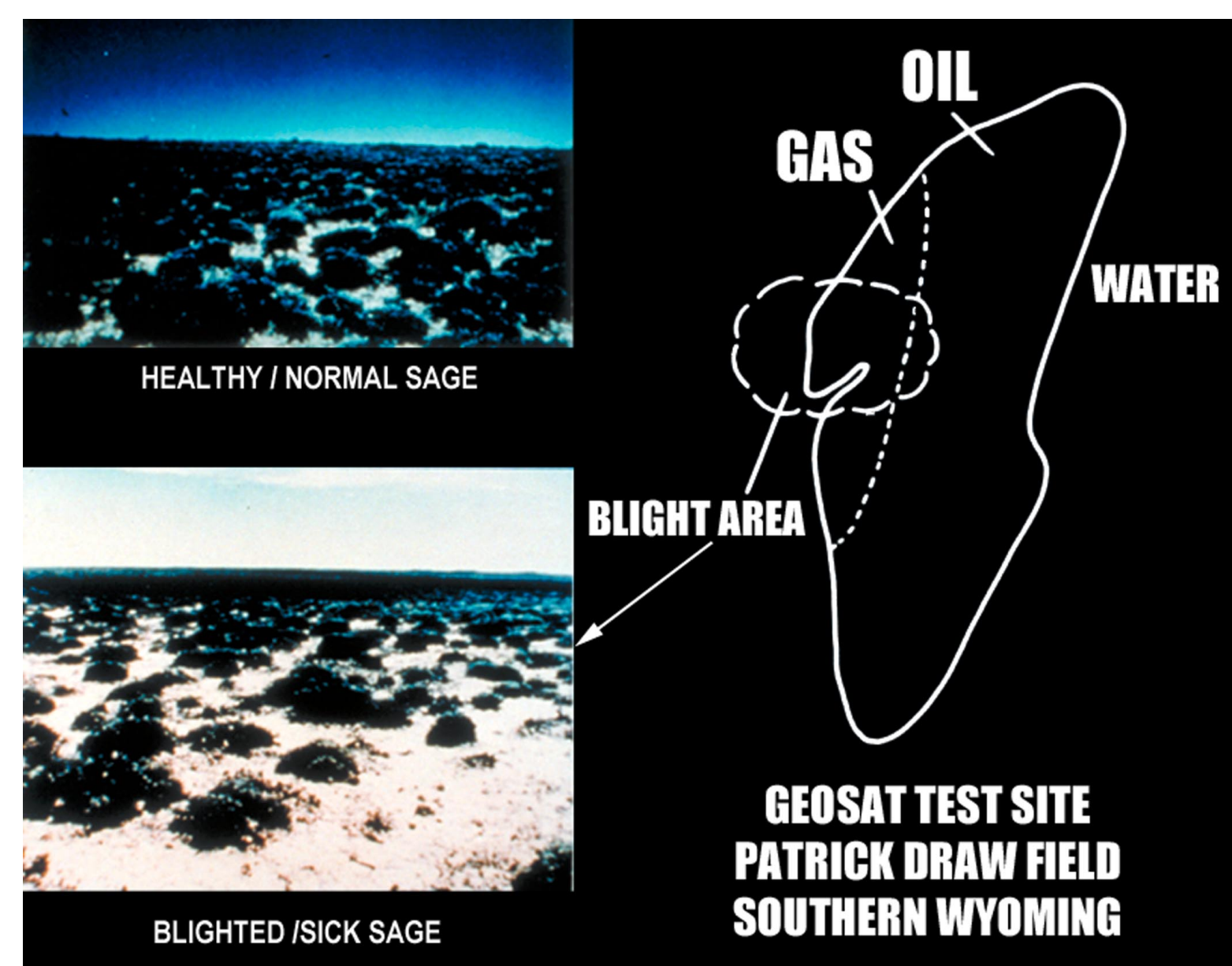
Gas	Number of Samples	Mean	Standard Deviation	Sum	Minimum	Maximum
4-Ft Soil Gas Data*						
C <sub>1</sub>	221	499.79	3,688.93	110,454.73	0.37	32,606.00
C <sub>2</sub>	221	42.46	286.83	9,383.56	0.00	2,341.90
C <sub>3</sub>	221	13.23	92.34	2,924.02	0.00	703.98
iC <sub>4</sub>	219	5.04	34.85	1,103.74	0.00	283.64
nC <sub>4</sub>	220	4.45	37.52	978.30	0.00	386.56
C <sub>1+</sub>	219	570.13	4,082.52	124,858.49	0.39	36,322.08
C <sub>2+</sub>	219	65.80	448.48	14,409.38	0.01	3,716.08
12-Ft Free Soil-Gas Data**						
C <sub>1</sub>	96	53.65	35.57	5,150.43	0.02	3,352.00
C <sub>2</sub>	92	1.32	6.69	121.90	0.02	63.84
C <sub>3</sub>	94	0.65	2.66	61.33	0.03	24.89
iC <sub>4</sub>	77	0.31	1.19	24.11	0.00	7.72
nC <sub>4</sub>	82	0.54	1.97	44.09	0.01	12.93
C <sub>1+</sub>	69	64.34	415.40	4,439.33	1.78	3,460.93
C <sub>2+</sub>	69	3.46	13.49	238.87	0.28	108.93
Disaggregate Soil-Gas Data**						
C <sub>1</sub>	246	98.03	61.29	24,115.91	5.15	328.76
C <sub>2</sub>	247	3.94	2.88	973.38	0.15	22.73
C <sub>3</sub>	247	2.42	2.23	597.75	0.04	17.26
iC <sub>4</sub>	247	0.88	1.36	217.36	0.00	11.92
nC <sub>4</sub>	247	2.46	2.82	607.38	0.00	19.27
C <sub>1+</sub>	246	107.66	67.49	26,483.57	5.43	353.48
C <sub>2+</sub>	246	9.62	8.22	2,367.66	0.28	54.23
Acid-Extraction Soil-Gas Data†						
C <sub>1</sub>	225	1,048.27	741.91	235,859.80	10.40	3,828.40
C <sub>2</sub>	225	59.67	40.11	13,424.80	0.90	210.80
C <sub>3</sub>	225	22.48	14.85	5,058.00	0.40	69.60
iC <sub>4</sub>	225	5.33	4.23	1,198.20	0.10	31.10
nC <sub>4</sub>	225	8.50	5.78	1,913.60	0.30	28.30
C <sub>1+</sub>	225	1,144.24	801.99	257,454.40	12.20	4,132.70
C <sub>2+</sub>	225	95.98	64.20	21,594.60	1.80	321.20



Principal component color composite of aircraft scanner data (TMS) of Patrick Draw



Enlarged view of a principal component color composite for a Landsat subsense showing the location of important geologic features at Patrick Draw



Ground views of normal and sick sage at Patrick Draw

\*ppm (vol). Complete data set used in statistics  
 \*\*ppm (vol).  
 †ppb (vol).