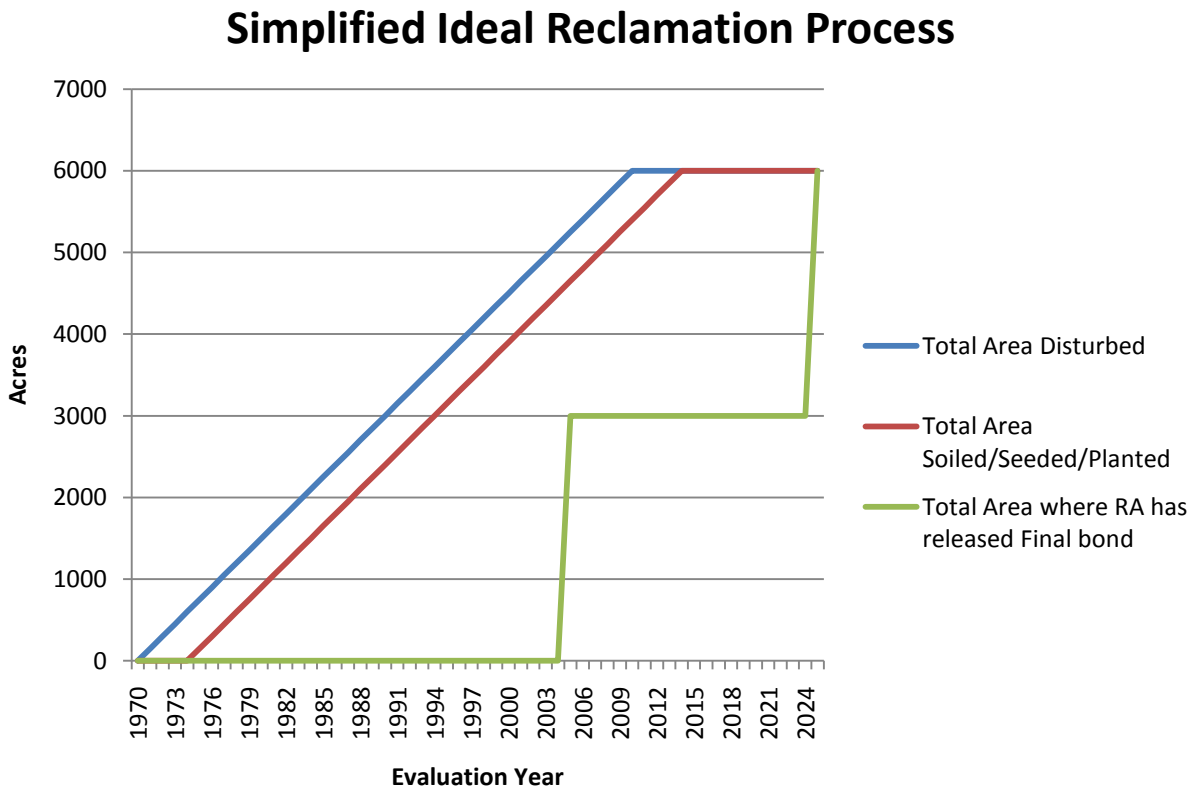
Contemporaneous Reclamation in Wyoming (EY2011)

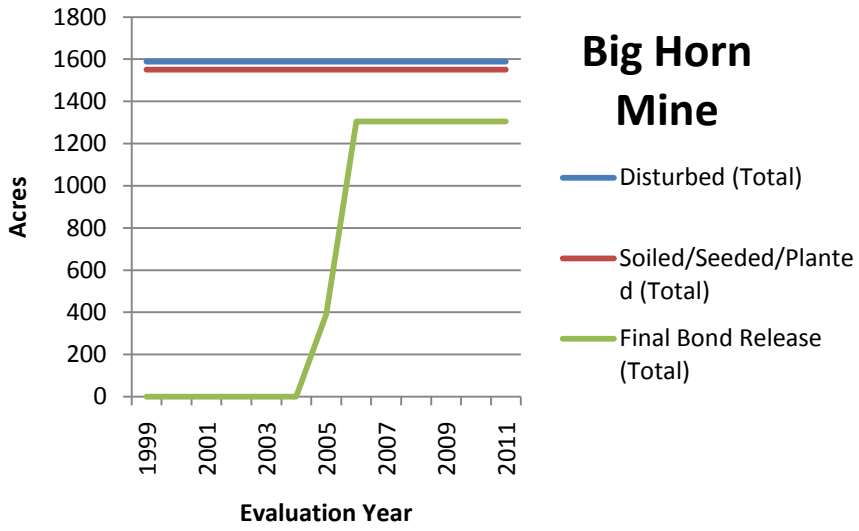
According to the measurements used in REG-8 and reviews of current reclamation plans, our analysis shows that the Wyoming State program is generally effective in achieving its goal of having disturbed lands reclaimed to the approved post-mining land use as contemporaneously as possible. Current trends however, suggest that contemporaneous reclamation could improve. Both State and Federal regulations do not require that an operator file for bond release at any prescribed time. Therefore, operators typically do not file for Final bond release until it is economically advantageous for them to do so. Operators tend to wait until large tracts of land are eligible for bond release and then apply for them. As a result, the number of acres released from Final bond is relatively small compared to the number of acres actually re-graded, soiled and seeded. It should also be noted that REG-8 currently utilizes bond release as a measurement to determine reclamation success.

CFO believes another general measurement for contemporaneous reclamation is a comparison of the rate at which lands are being permanently reclaimed (re-graded, topsoiled and seeded) to the rate of disturbance. Ideally, the rate of reclamation should match the rate of disturbance.



The above graph is a "simplified ideal" representation of the reclamation process. Disturbance, represented by the blue line, occurs when the mine begins operation. For the first couple of years, a boxcut is formed, with adjacent spoil piles. Reclamation, represented by the red line, begins several years after the start of operations, when enough spoil has accumulated to warrant backfilling, topsoiling and seeding. Ideally, the red line should run parallel to the blue line. The slope (the rate of reclamation) of the red line should be equal to the slope (the rate of disturbance) of the blue line. For comparative purposes, the green line, representing acres that achieve final bond release, is included. A bond release package requires an investment of time and money from the operator. A comparable amount of effort and expense is required to develop a bond release package for a small plot of land as for a large one. It is also not a requirement for operators to achieve Phase I or II bond release incrementally, prior to achieving final bond release. So, it is often more cost effective for operators to wait until large areas of land are eligible for release until developing and submitting a bond release application. And those applications often bypass earlier incremental bond releases and attempt to qualify for Final bond release in one application package. As a result, bond release can be an inaccurate measure of actual reclamation activities.

This tendency for Final bond release to occur in large blocks of acreage is demonstrated by the graph below. This shows the reclamation plot for the Big Horn Mine. The Big Horn Mine has neither disturbed nor reclaimed any acreage since 1999 (when CFO began consistent collection of this data); however, it achieved near final bond release during EY 2006. Note how the final bond release packages were achieved in two large blocks of acreage, one in 2005 and in 2006.



The following table shows the database for reclamation over time for all of Wyoming. This file will be stored on the CFO share drive and will be updated annually, as new data is supplied by the State Regulatory Authority.

Cumulative Wyoming Reclamation Status Table EY-1999 to Present

RECLAMATION STATUS OF ALL AREAS DISTURBED UNDER THE PERMANENT REGULATORY PROGRAM																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
EVALUATION YEAR	Disturbed area		Long-term mining or reclamation facilities	Active mining areas	Areas backfilled and graded		Areas released phase I bond		Areas soiled and seeded / planted		Areas released phase II bond		Areas final seeded / planted for 10 years		Areas released phase III bond	
	EY	Total (all years)			EY	Total (all years)	EY	Total (all years)	EY	Total (all years)	EY	Total (all years)	EY	Total (all years)	EY	Total (all years)
1999	3491	97846	22428	29121	2790	42055	303	7081	2972	41107	106	2015	956	27107	106	820
2000	5082	102928	25969	32463	2441	44496	176	7257	2953	44060	352	2367	1364	28471	33	853
2001	4281	107209	25785	34248	2680	47176	122	7379	2629	46689	0	2367	1609	30080	0	853
2002	4174	111383	27491	34875	1841	49017	521	7900	1729	48418	182	2549	996	31076	216	1069
2003	4502	115885	28397	36882	1589	50606	4202	12102	1882	50300	271	2820	920	31996	305	1374
2004	5138	121023	29398	36209	4810	55416	10922	23024	2822	53122	1545	4365	1356	33352	148	1522
2005	8768	129791	31680	37198	5497	60913	8405	31429	5665	58787	634	4999	980	34332	392	1914
2006	4520	134311	30005	39630	3763	64676	2219	33648	3705	62492	992	5991	1523	35855	1569	3483
2007	4658	138969	31027	41358	1908	66584	1387	35035	579	63071	376	6367	1562	37417	1043	4526
2008	9264	148233	33713	44428	3508	70092	13	35048	781	63852	2366	8733	3162	40579	0	4526
2009	5715	153948	34511	46080	3265	73357	6344	41392	4471	68323	1425	10158	3620	44199	533	5059
2010	5565	159513	32263	50740	3153	76510	2378	43770	3965	72288	0	10158	2417	46616	476	5535
2011	6496	166009	33312	52386	3801	80311	2631	46401	2777	75065	217	10375	2935	49551	217	5752

Data from the above table was used to produce the following graph. This graph tracks the area of reclaimed mine lands that were backfilled, soiled, seeded and planted over time to represent the rate of reclamation of mine lands in Wyoming. A rate of reclamation that closely mirrors the rate of disturbance indicates contemporaneous reclamation efforts. Divergence of the two lines could indicate a drop in contemporaneous reclamation.

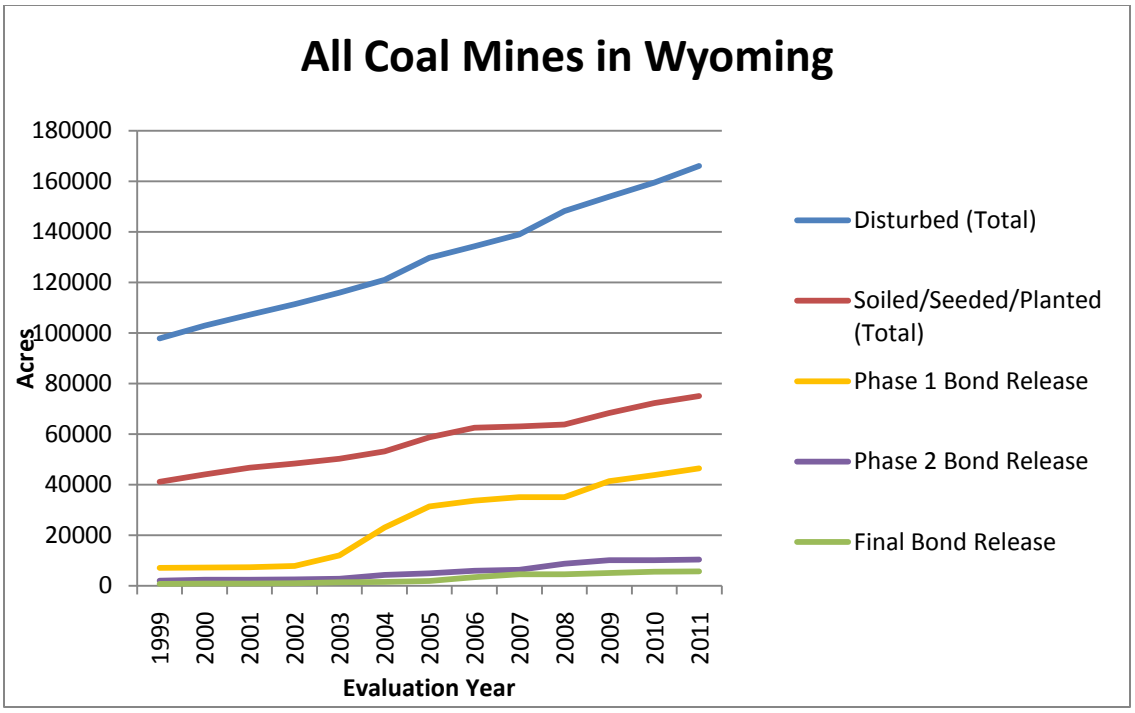

All Coal Mines in Wyoming
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
Acres
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Phase 1 Bond Release
Phase 2 Bond Release
Final Bond Release

Chart 1

WYOMING RECLAMATION SUMMARY

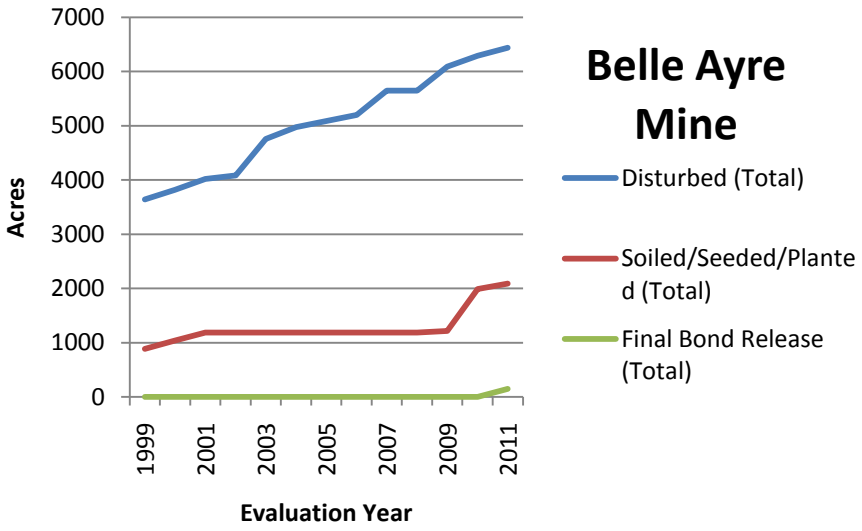
EVAL YEAR	ACRES DISTURBED in the current year	Cumulative Acres Disturbed	ACRES RECLAIMED in the current year	Cumulative Acres Reclaimed	RATIO OF RECLAIM VS DISTURBED in the current year	Cumulative RATIO OF RECLAIMED VS DISTURB
1999	3491	97846	2972	41107	0.85	0.42
2000	5082	102928	2953	44060	0.58	0.43
2001	4281	107209	2629	46689	0.61	0.44
2002	4174	111383	1729	48418	0.41	0.43
2003	4502	115885	1882	50300	0.42	0.43
2004	5138	121023	2822	53122	0.55	0.44
2005	8768	129791	5665	58787	0.65	0.45
2006	4520	134311	3705	62492	0.82	0.47
2007	4658	138969	579	63071	0.12	0.45
2008	9264	148233	781	63852	0.08	0.43
2009	5715	153948	4471	68323	0.78	0.44
2010	5565	159513	3965	72288	0.71	0.45
2011	6496	166009	2777	75065	0.43	0.45

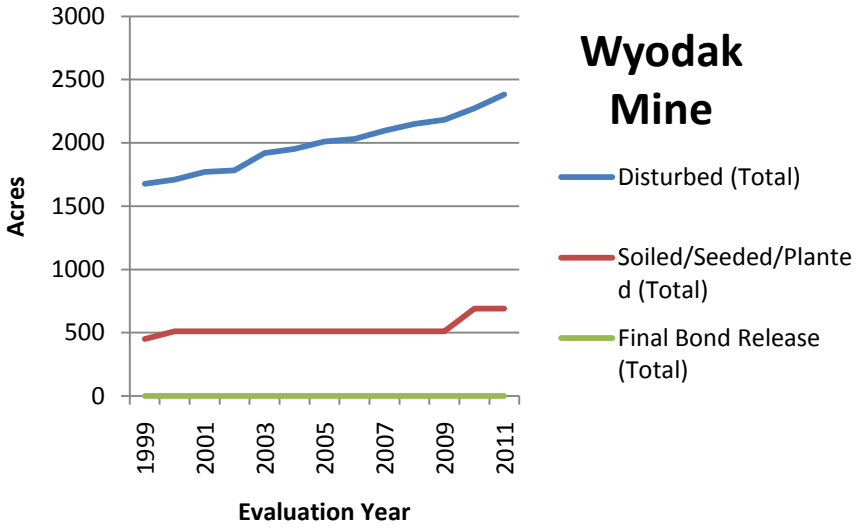
Source: 2011 Government Performance Reporting Act (GPRA) data collected from WY-DEQ

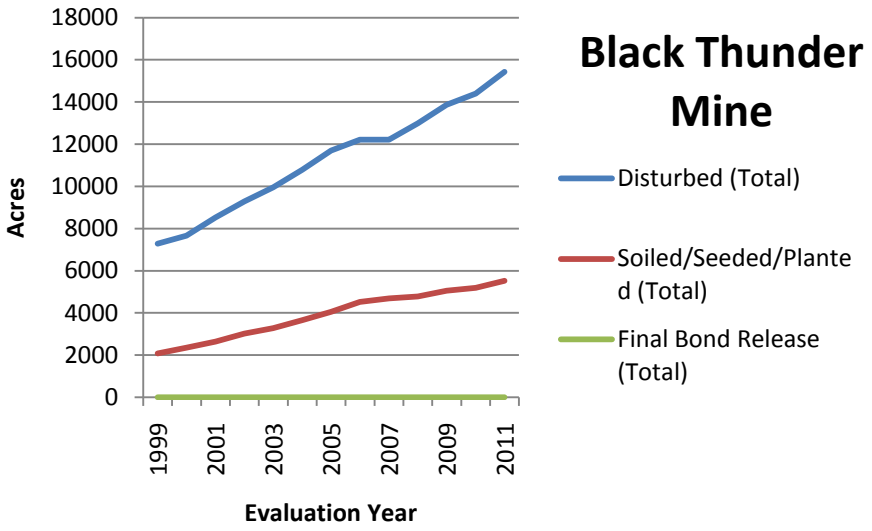
Chart 1 provides the actual acres disturbed and reclaimed annually for all mines. A notable drop in the rate of reclamation has occurred during the past year, however, the cumulative reclamation to disturbance ratio has remained relatively steady and is currently 0.45, as indicated on the chart. This ratio indicates that 45 percent of the cumulative acres disturbed in Wyoming have been reclaimed to the point of being backfilled, graded and seeded.

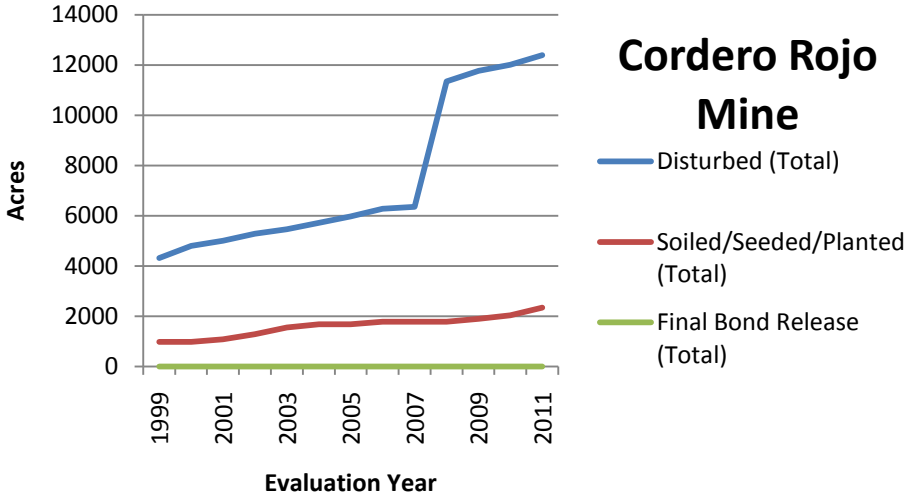
The graph of All Coal Mines in Wyoming (above) seems to show a slight divergence in the lines plotting disturbance and reclamation. This may be indicative of issues that should be addressed to improve the level of contemporaneous reclamation in Wyoming. Possible causes of line divergence may include the fact that no time requirements exist for coal mine reclamation in the state of Wyoming. Another factor may be mine expansion and the fact that long term mine facilities, such as haul roads, tend to increase disturbance. It also appears that a drop in contemporaneous reclamation occurred in 2007 and 2008, when the ratio of reclaimed vs. disturbed dropped from 0.82 to 0.12 and 0.08, respectively. A possible explanation for this drop in contemporaneous reclamation may be that new pits were opened, which could have caused the drop. It should also be noted that the cumulative ratio of reclaimed vs. disturbed has remained relatively steady (0.45 in 2011), which reflects favorably on reclamation efforts in Wyoming.
Reclamation data is also collected for individual mining operations in Wyoming. There are currently thirty-six permitted mines operating in Wyoming. The following graphs are grouped into three categories, and demonstrate the degree to which Wyoming mines are contemporaneously conducting reclamation activities.

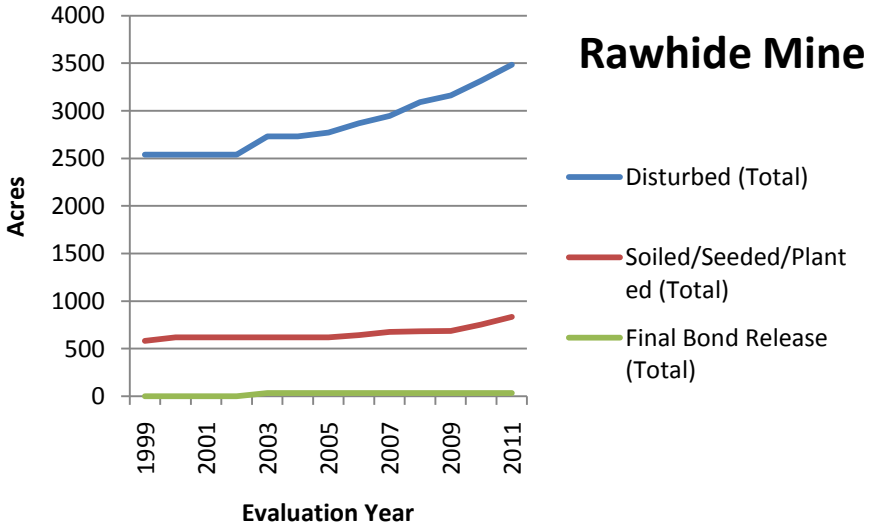
The first series of graphs below show Wyoming mines that currently have active mining and reclamation operations.

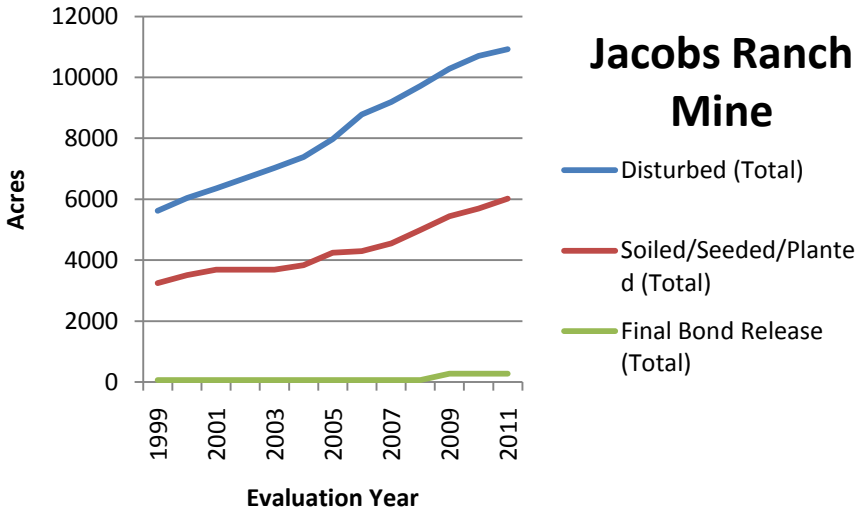

Belle Ayre Mine
7000
6000
5000
4000
3000
2000
1000
0
Acres
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

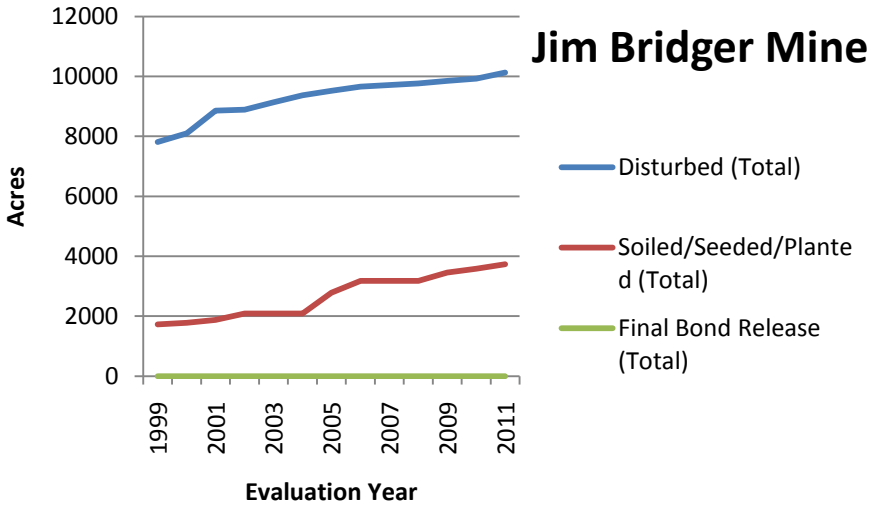

Wyodak Mine
3000
2500
2000
1500
1000
500
0
Acres
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

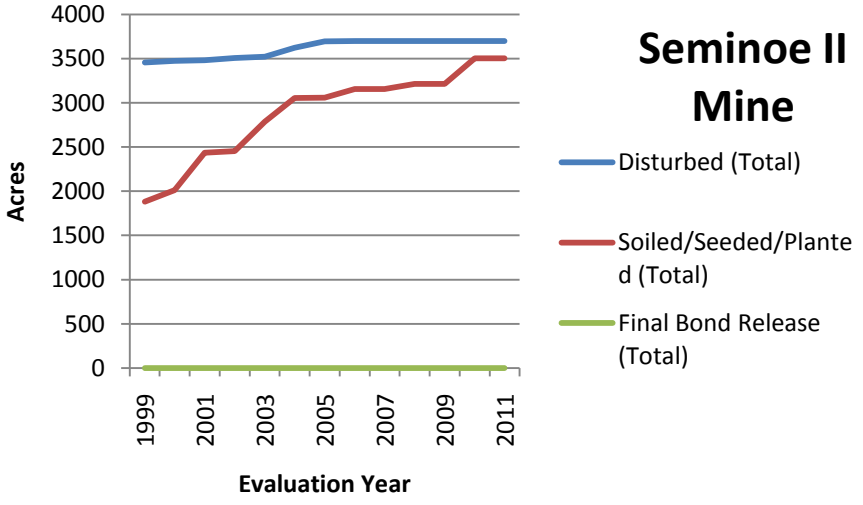

Black Thunder Mine
Acres
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

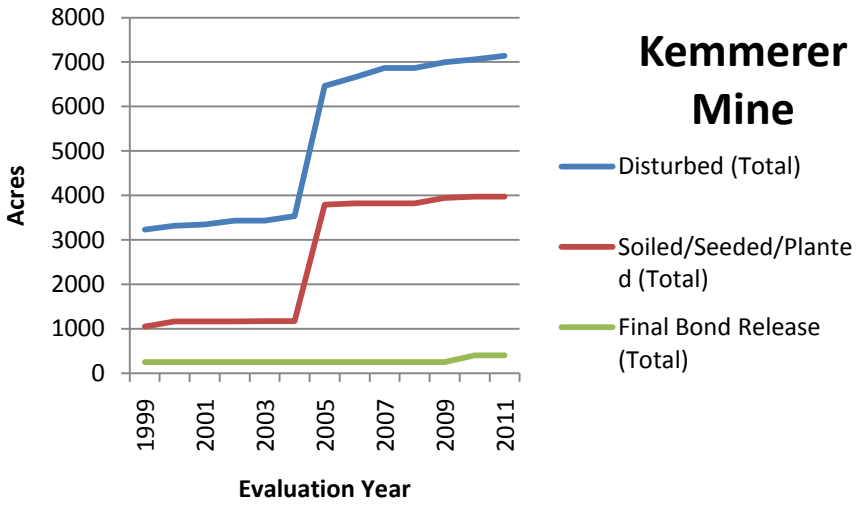

Cordero Rojo Mine
Acres
14000
12000
10000
8000
6000
4000
2000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

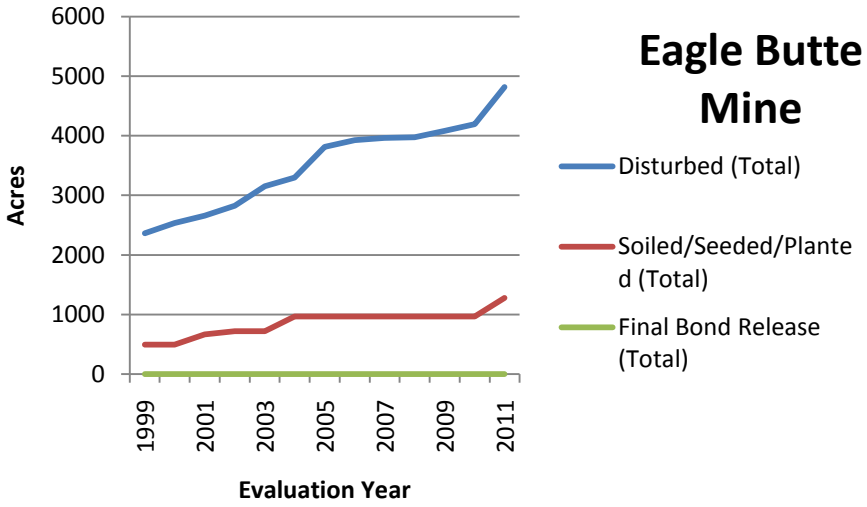

Rawhide Mine
Acres
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

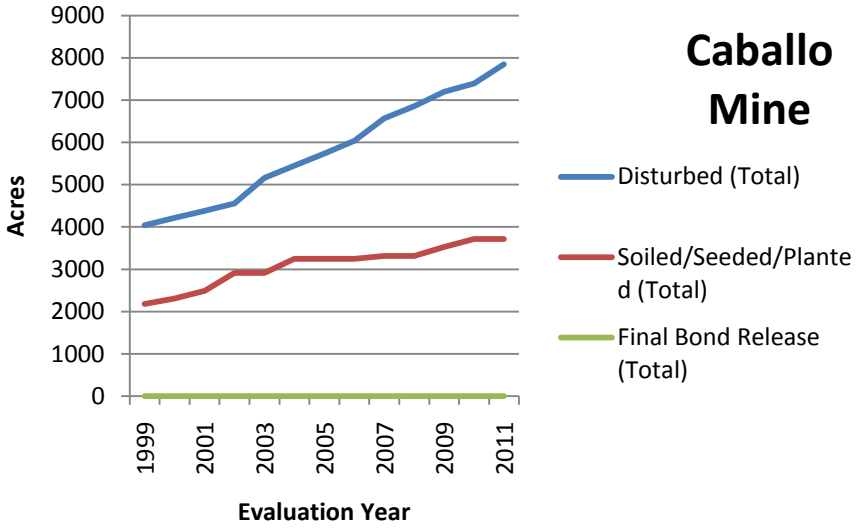

Jacobs Ranch Mine
Acres
12000
10000
8000
6000
4000
2000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

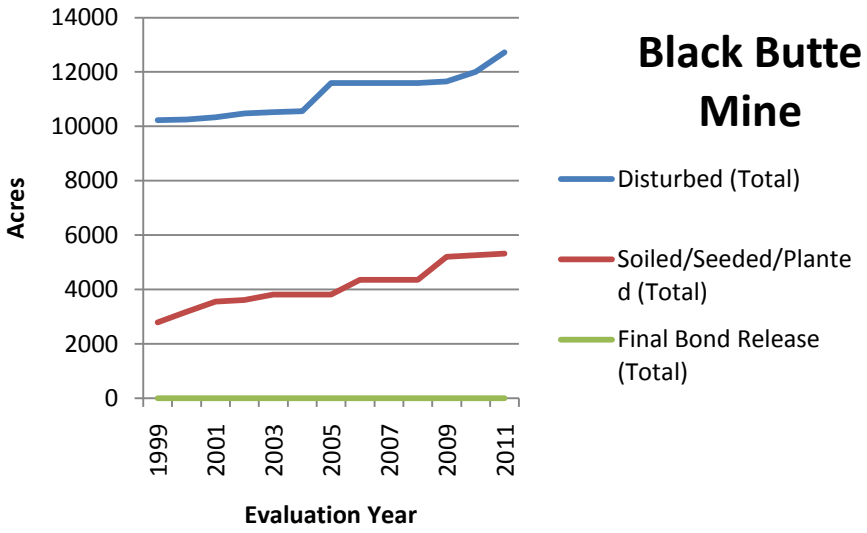

Jim Bridger Mine
Acres
12000
10000
8000
6000
4000
2000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

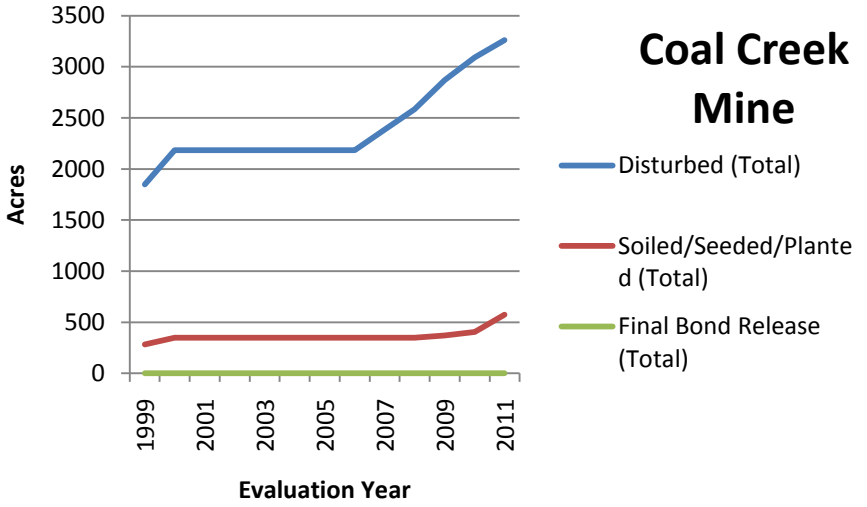

Seminoe II Mine
Acres
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

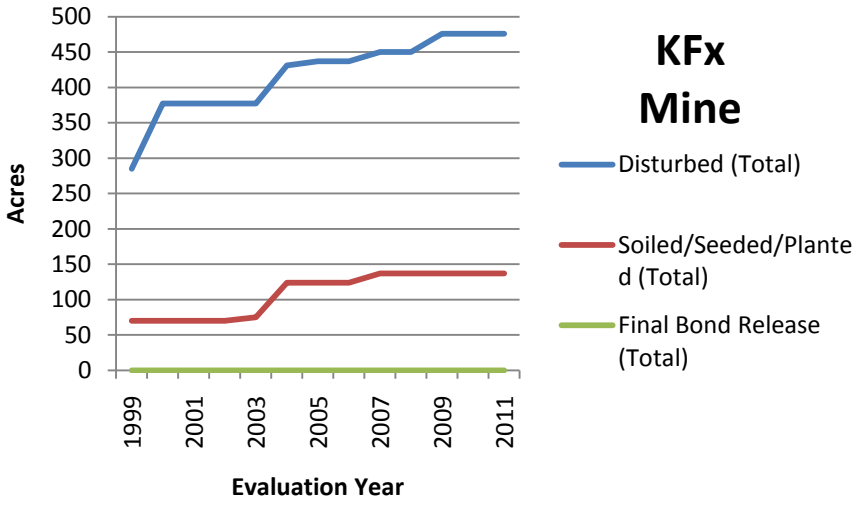

Kemmerer Mine
Acres
8000
7000
6000
5000
4000
3000
2000
1000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

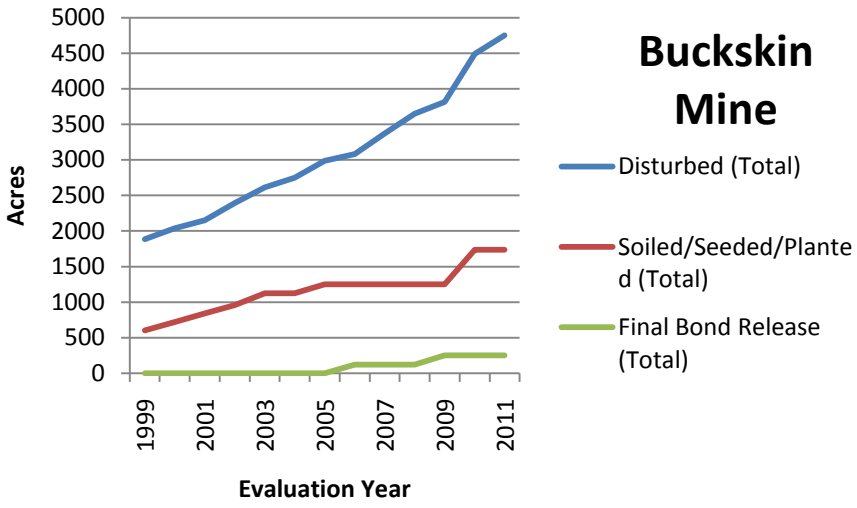

Eagle Butte Mine
Acres
6000
5000
4000
3000
2000
1000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

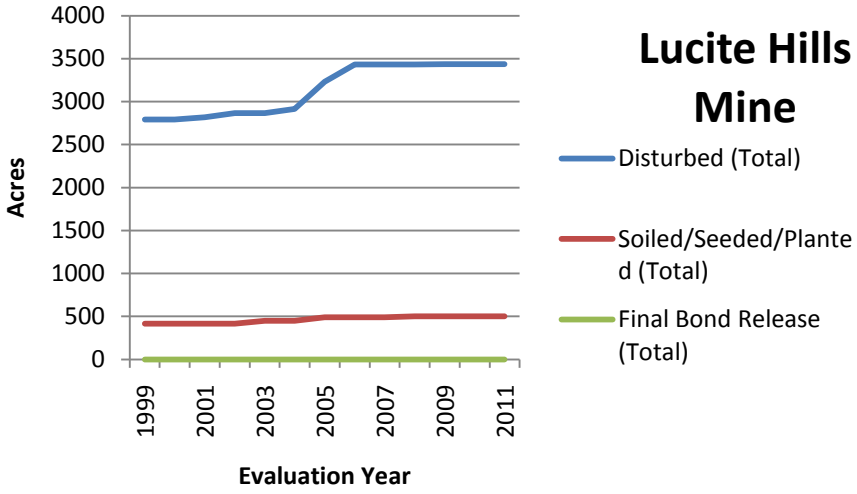

Caballo Mine
Acres
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

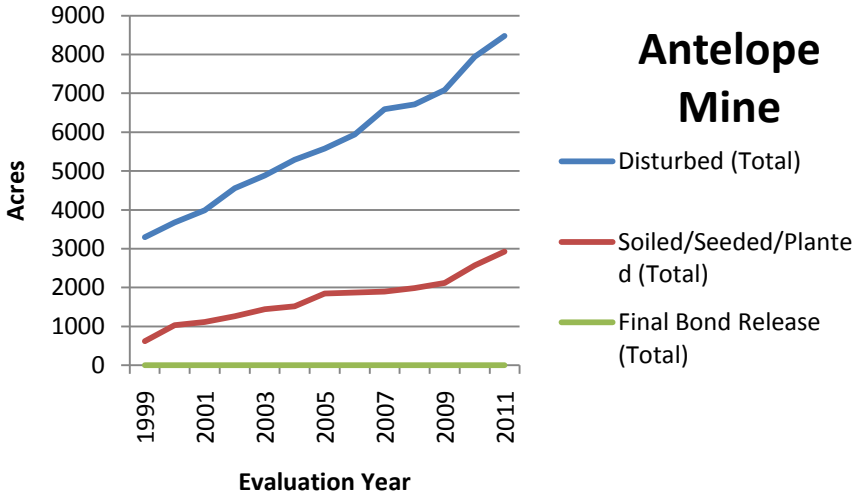

Black Butte Mine
Acres
14000
12000
10000
8000
6000
4000
2000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

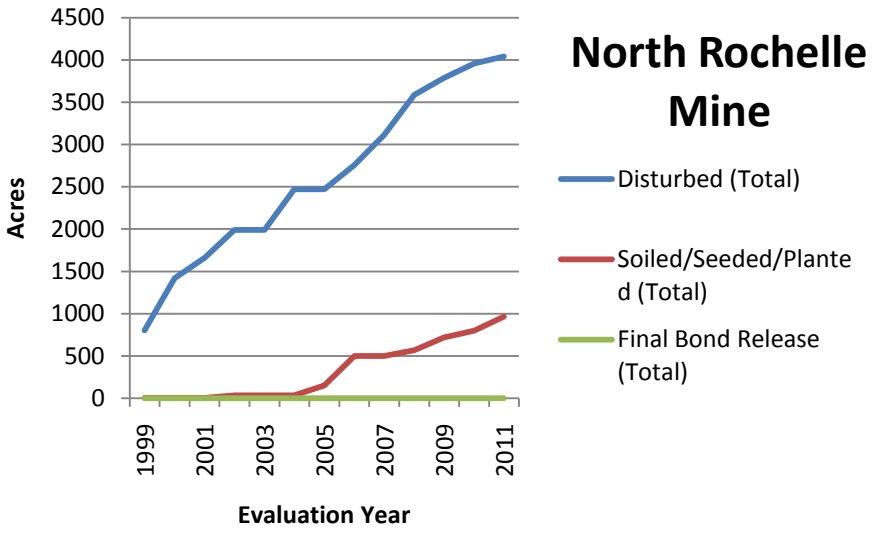

Coal Creek Mine
Acres
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

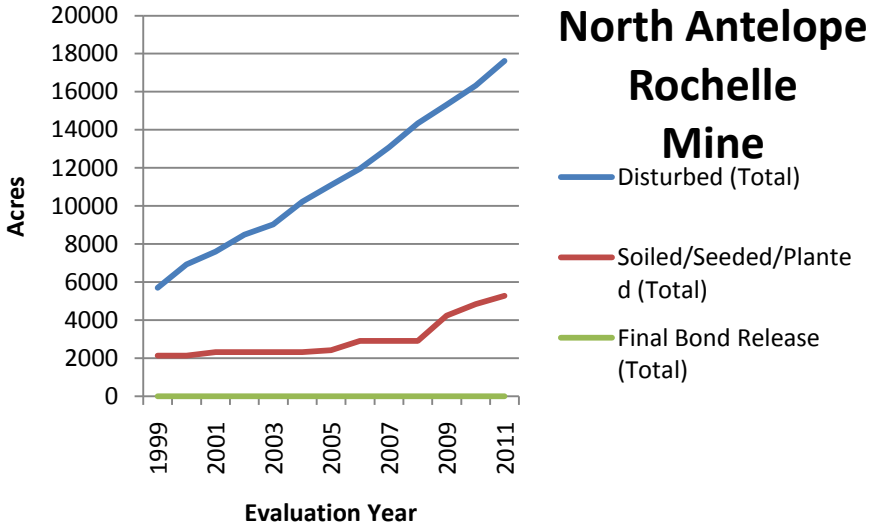

KFx Mine
Acres
500
450
400
350
300
250
200
150
100
50
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

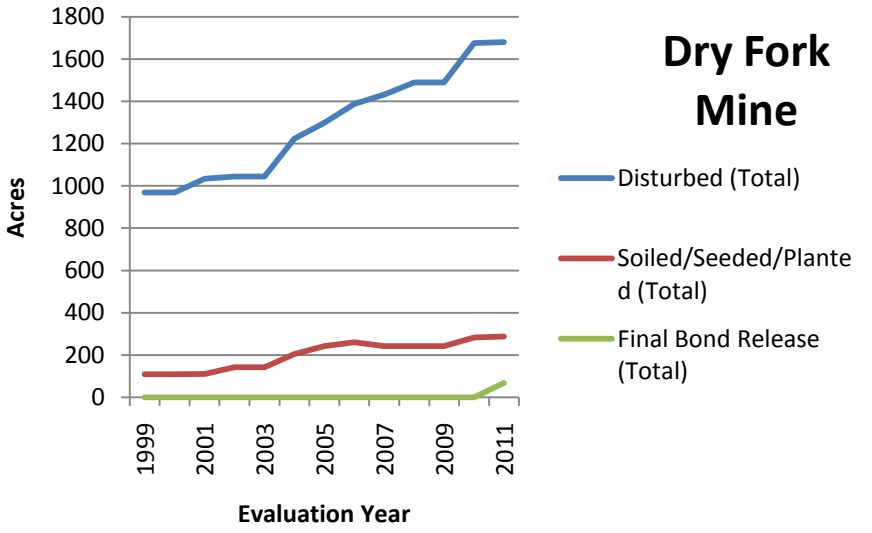

Buckskin Mine
Acres
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

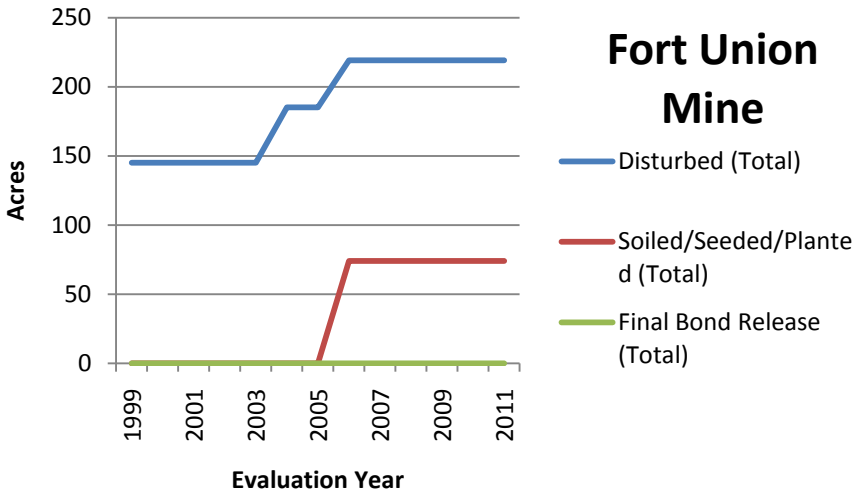

Lucite Hills Mine
Acres
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

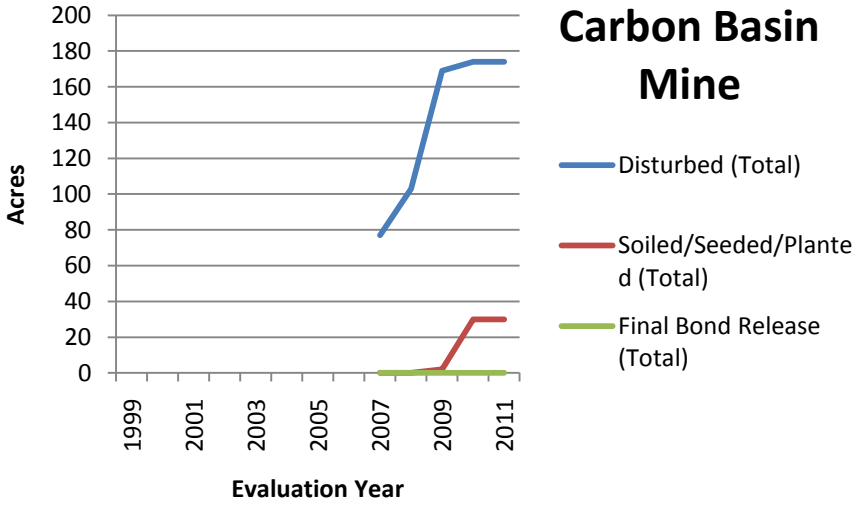

Antelope Mine
Acres
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

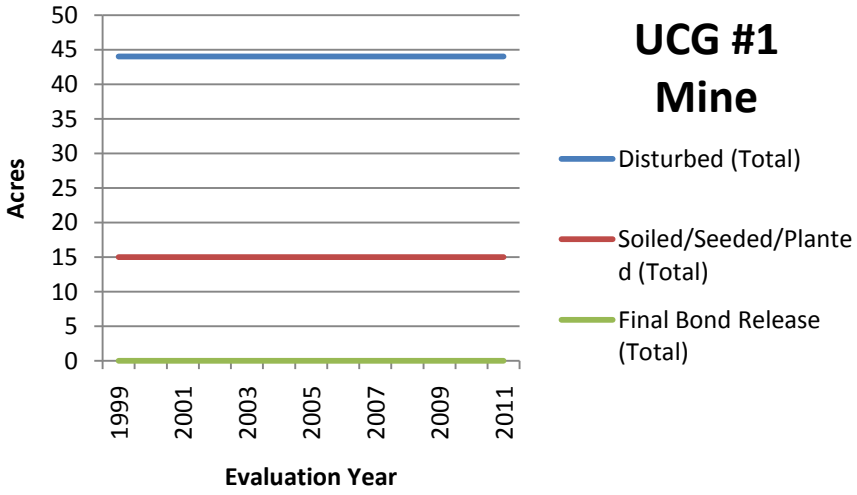

North Rochelle Mine
Acres
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

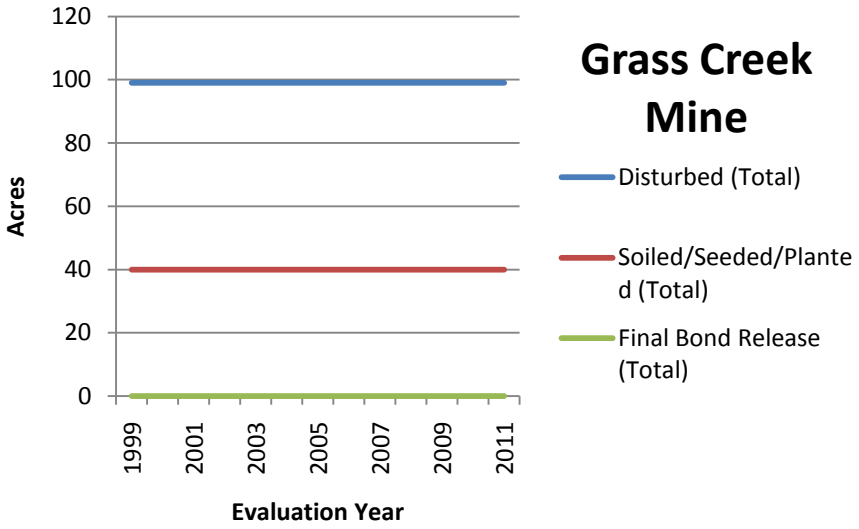

North Antelope Rochelle Mine
Acres
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)


Dry Fork Mine
Acres
1800
1600
1400
1200
1000
800
600
400
200
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

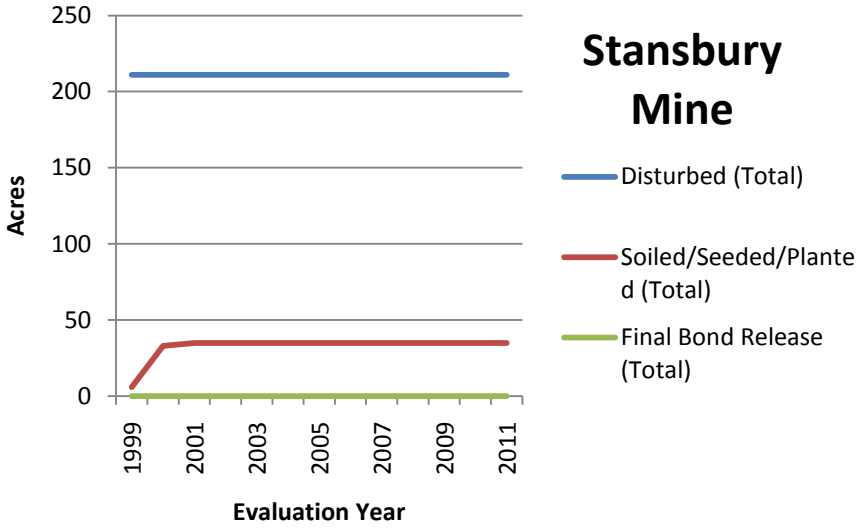

Fort Union Mine
Acres
250
200
150
100
50
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

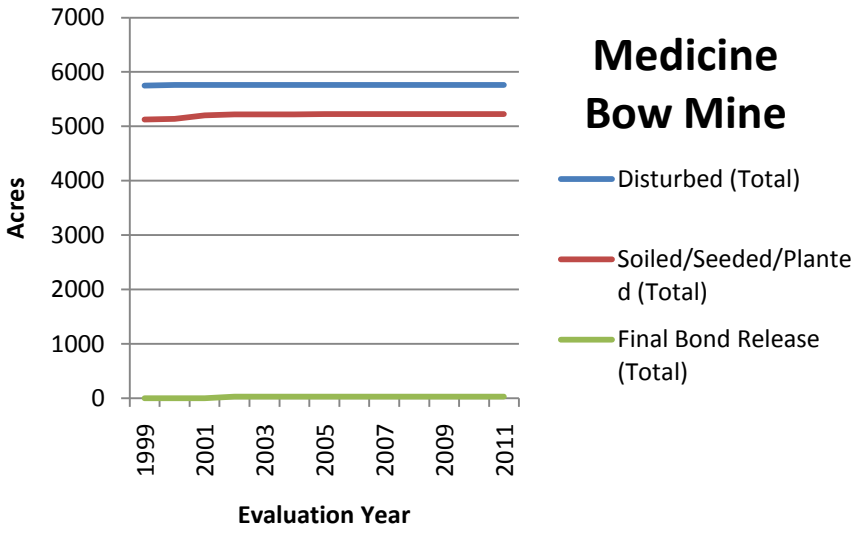

Carbon Basin Mine
Acres
200
180
160
140
120
100
80
60
40
20
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)


UCG #1 Mine
Acres
50
45
40
35
30
25
20
15
10
5
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

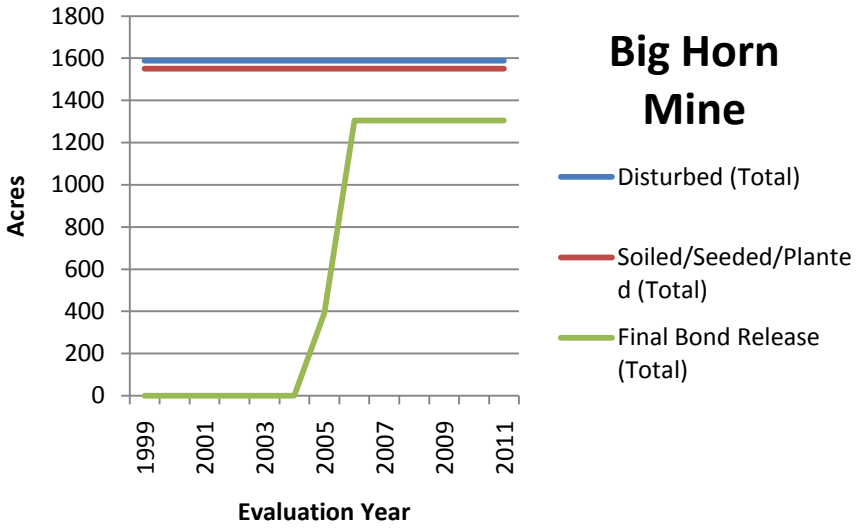


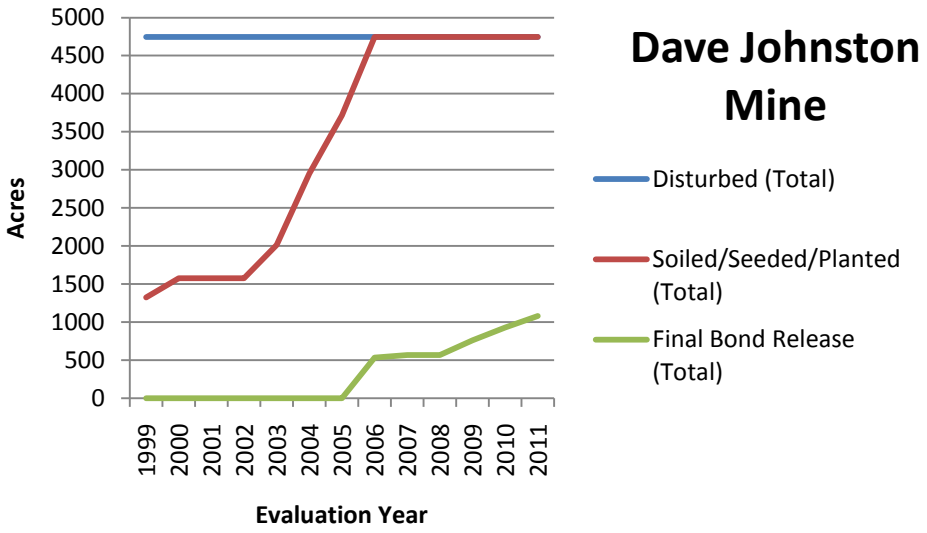
The second series of charts below shows Wyoming mines where mining operations are complete and reclamation progress is pending.

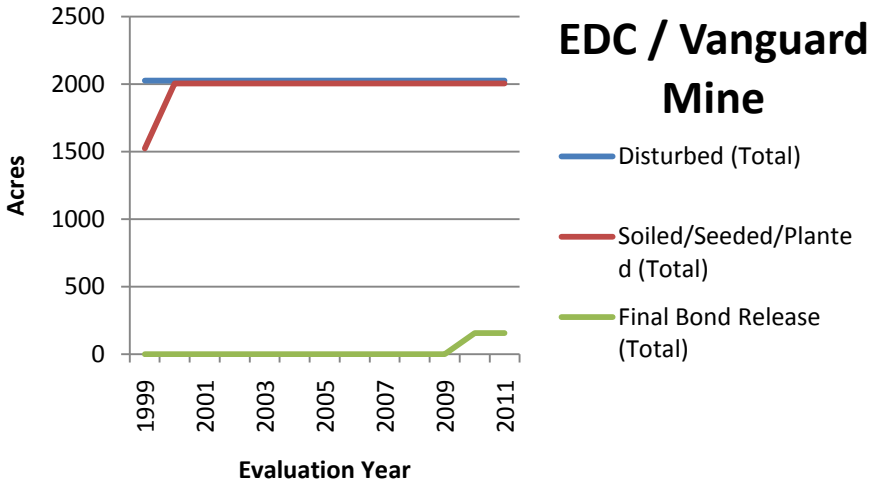


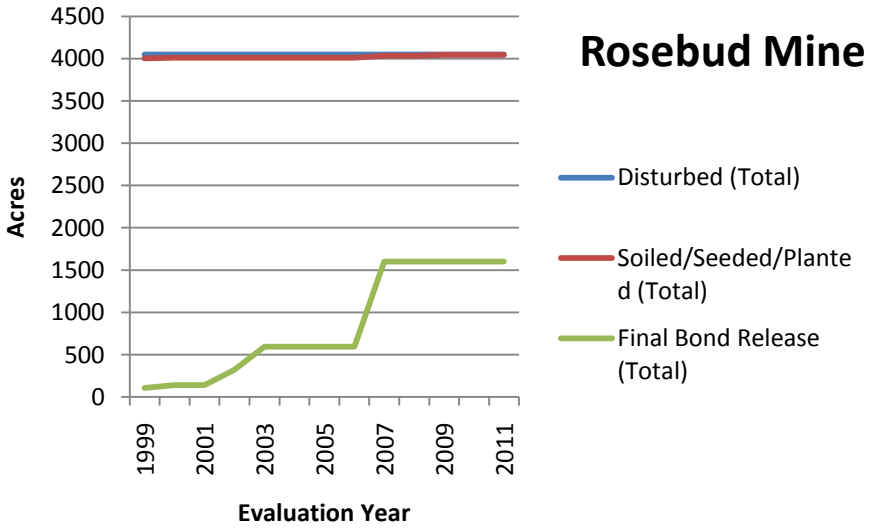


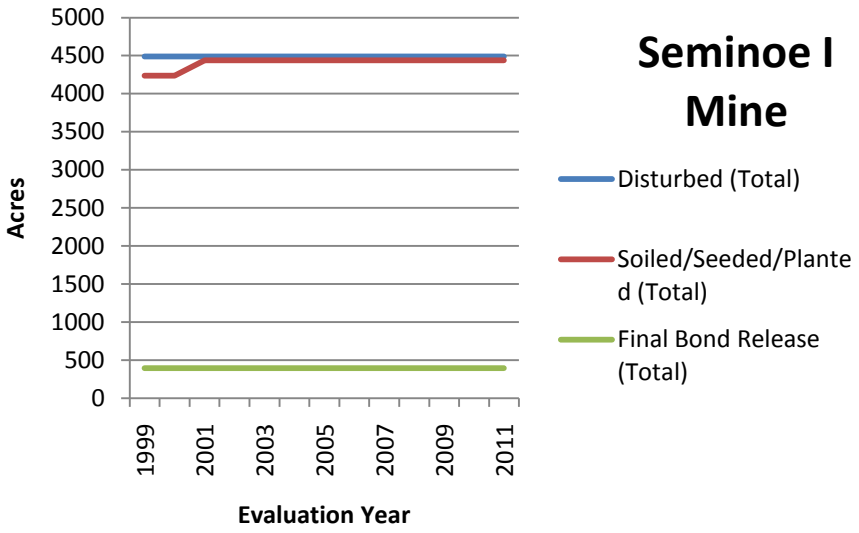
The third series of charts below shows Wyoming mines that have ended active mining operations completely. All disturbed acreage has also been soiled and seeded, with the mine's final bond release pending. Note how the lines indicating disturbance and soiled/seeded/planted have all converged. Also note how final bond release, where it has occurred, occurs in blocks of acreage.

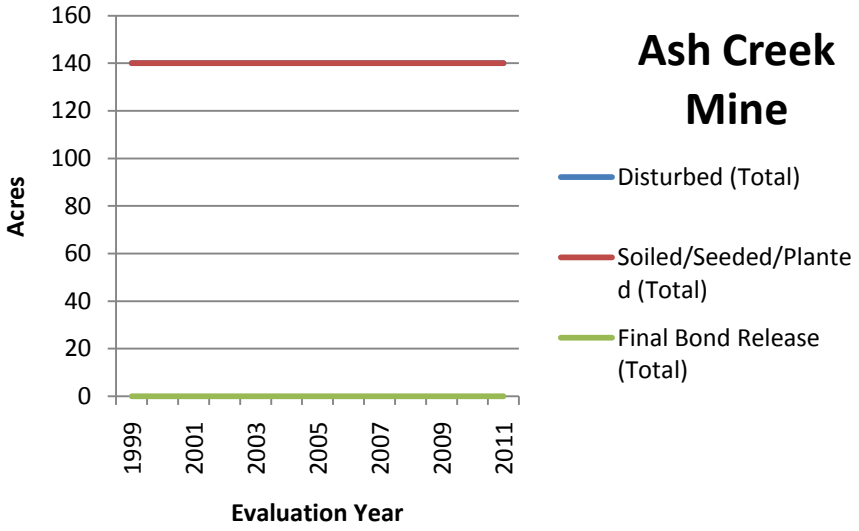


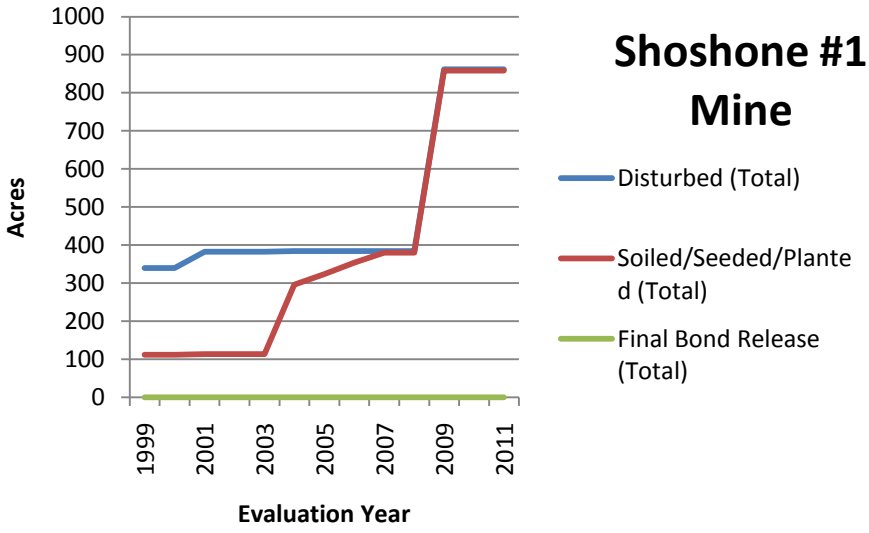

Dave Johnston Mine
Acres
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

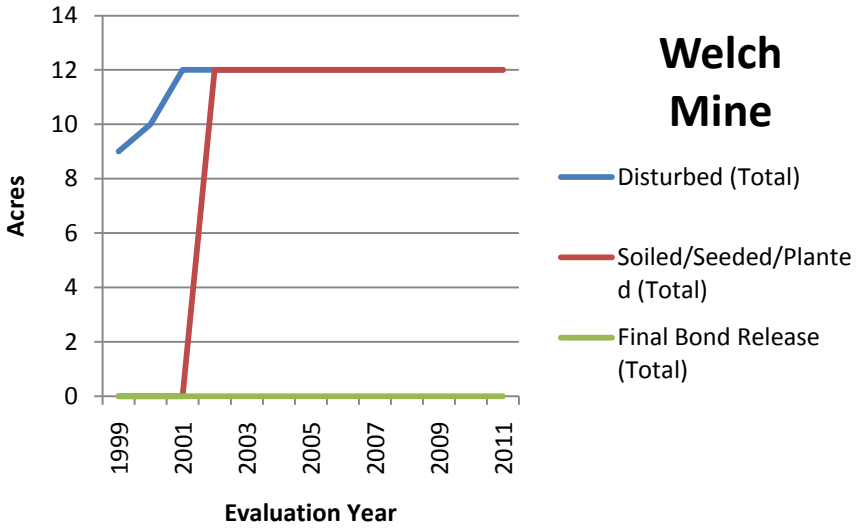

EDC / Vanguard Mine
Acres
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)

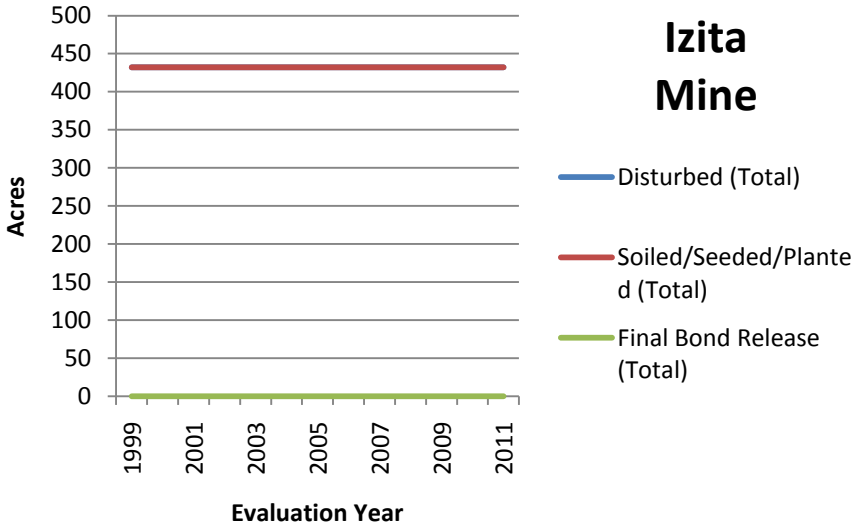

Rosebud Mine
Acres
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)


Seminoe I Mine
Acres
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)


Ash Creek Mine
Acres
160
140
120
100
80
60
40
20
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)


Shoshone #1 Mine
Acres
1000
900
800
700
600
500
400
300
200
100
0
1999
2001
2003
2005
2007
2009
2011
Evaluation Year
Disturbed (Total)
Soiled/Seeded/Planted (Total)
Final Bond Release (Total)





The data used for these charts is supplied annually by the Wyoming Department of Environmental Quality-Land Quality Division (WYDEQ-LQD), who, in turn, collects this information from the individual mine operators. Efforts to ensure data accuracy and consistency include the use of annual validation and verification checklists. Data may also be interpreted from annual end of year mine maps. These maps may be in the form of aerial photographs, GIS or AutoCAD files. A cooperative effort is ongoing between OSM, WYDEQ-LQD, and individual operators to report the most accurate and representative view of reclamation efforts in the State of Wyoming possible. The CFO feels that reclamation in Wyoming is occurring contemporaneously, but that the disturbance vs. reclamation lines (as shown in the All Mines in Wyoming chart above) are slightly diverging. Further analysis and consultation between OSM and WYDEQ-LQD is needed in order to explain the divergence.

This past year has seen a significant increase in the development of new mine areas, and a resulting delay in final reclamation. This can be seen as a predictable aspect of the mining process. When mining ceases in a pit area, a large spoil area behind the final pit cannot be reclaimed as quickly as desired. This is because the spoil material must be transported and used to backfill the final pit to meet AOC requirements. This can cause a short term delay in final reclamation. However, as the spoil piles are re-graded and the final pit is properly backfilled to AOC requirements, large acreages will likely be reclaimed in future years. Likewise, as new areas are developed, several pits must be mined before a large enough area is available to move and re-grade boxcut spoils to ensure the AOC requirements are met. Once enough boxcut spoil has been placed in its final location to meet AOC requirements, large areas become available for soil re-spreading and seeding. The CFO will continue to report reclamation success and inventory the status of disturbed lands for future reports.

Attached: (Memorandum) Comments received 9/7/2011 from WYDEQ-LQD.

MEMORANDUM

TO: Jeff Fleischman

FROM: Carol Bilbrough

DATE: September 6, 2011

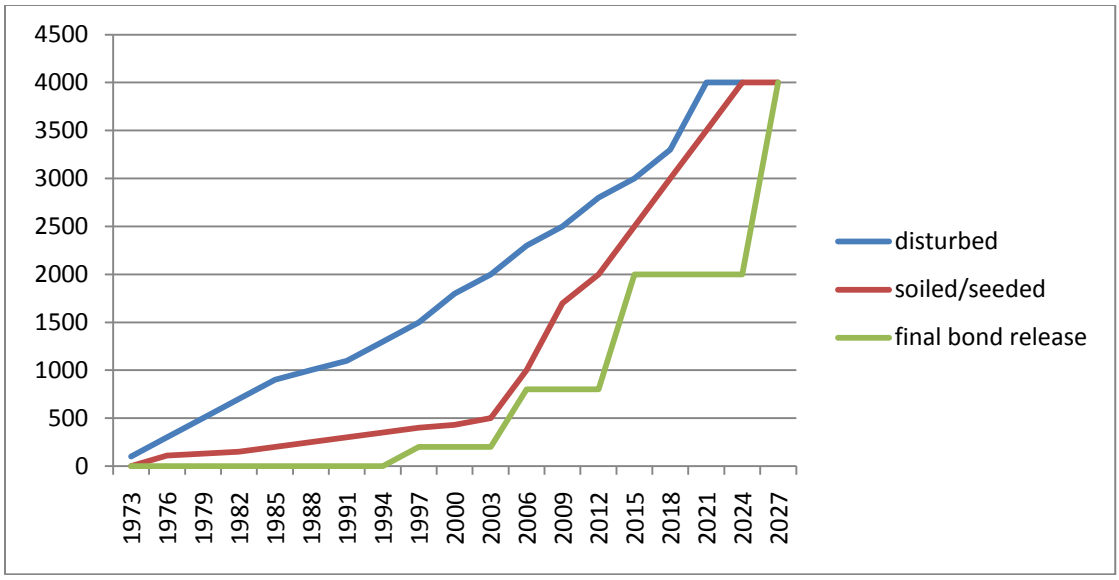
SUBJECT: **Office of Surface Mining Contemporaneous Reclamation Report Comments**

1. The terminology OSM used for bond release is different than LQD terminology, which distinguishes between "full" and "final" bond release. Full bond release refers to phase 3 bond release, while final is only used by LQD for phase 3 when a mine is fully phase 3 bond released and it is the final bond release on the mine. We need to ensure that we all understand the terminology used by LQD and OSM, and want to verify our understanding is accurate.

2. LQD disagrees with the "Simplified Ideal Reclamation Process" graph on page one, and furthermore suggests that it sets standards for reclamation in Wyoming that are not possible, even under ideal circumstances. Because the graph is unrealistic, it will open coal mines and the regulatory program to unwarranted criticism. The OSM explanation for a delay in the final reclamation for coal mines on page 19 is very good. It also does not support the "ideal" graph presented on page one, but is more descriptive of the graph presented by LQD below.

The "total area disturbed" line presented on the OSM graph is very steep. This is not an "ideal" illustration. For example, the disturbed acreage for North Antelope Rochelle Mine, despite combining two mines and multiple amendments, shows a much shallower disturbed acreage slope (See graph below).

The LQD proposed graph assumes that no new lands, pits, haul roads, or facilities were added after 2003. Reclamation is delayed during initial mine development.



3. Again, including facilities overestimates the acreage available for reclamation, which is what is suggested by the blue line – total disturbed acres – in the graphs of all coal mines in Wyoming.

4. The Grass Creek Mine is categorized as reclamation pending. However, this mine is still active, albeit at a very slow pace.