## Identification of Genetic Markers Useful for Mixed Stock Analysis of Chinook Salmon in Cook Inlet, Alaska

by

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**Alaska Department of Fish and Game** 

**Division of Commercial Fisheries** 



#### **Symbols and Abbreviations**

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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#### REGIONAL INFORMATION REPORT 5J18-04

## IDENTIFICATION OF GENETIC MARKERS USEFUL FOR MIXED STOCK ANALYSIS OF CHINOOK SALMON IN COOK INLET, ALASKA

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#### **ABSTRACT**

Recent declines in abundances of Chinook salmon Oncorhynchus tshawytscha populations in Cook Inlet, Alaska, have led to fishery restrictions and designation of some populations as stocks of concern by the Alaska Board of Fisheries. The utility of genetic tools to inform fishery management in the area has been limited by the lack of genetic differentiation with existing genetic markers among key groups of populations, notably West Cook Inlet and Upper Yentna populations. We applied restriction-site associated DNA sequencing (RAD sequencing) to genotype tens of thousands of novel genetic markers in 283 individuals from 5 populations of Chinook salmon from northwestern Cook Inlet. After quality filtering, 282 individuals were genotyped for 13,804 markers and available for analysis. We selected 500 markers for development of a Cook Inlet panel based upon genetic differentiation among the 5 populations. Overall F<sub>ST</sub>, a measure of genetic differentiation, averaged 0.003 among all 13,804 markers and 0.029 among the 500 selected for panel development; differentiation among subsets of populations for the 500 panel markers was much higher. Following panel optimization, 183 of the 500 panel markers were incorporated into a panel with previously developed assays. A majority of the markers (171) included in the final panel were located on a linkage map of the Chinook salmon genome. Preliminary baseline investigations suggest that the West Cook Inlet group of populations is now distinguishable from Upper Yentna populations and that Deshka River Chinook salmon are also identifiable from all other Cook Inlet populations. These new markers should be useful in mixed stock analysis to inform management of Cook Inlet fisheries.

Key words: Cook Inlet, Chinook salmon, genetic markers, SNP

#### INTRODUCTION

The use of mixed stock analysis (MSA) to identify discrete stocks of Pacific salmon (Oncorhynchus spp.) has become a key feature of conservation and management activities in Alaska, where real-time assessment of fisheries can maximize harvest of abundant stocks while minimizing risk of overharvesting weaker stocks (Dann et al. 2013). Postseason analyses of mixed stock fisheries are vital to accurately estimate productivities and escapement goals (Cunningham et al. 2017) and inform allocative decisions (Shedd et al. 2016). While broad-scale reporting groups have been successfully identified through MSA, fine-scale stock differentiation is still problematic in many areas due to the low degree of structure exhibited among some populations of Chinook salmon (O. tshawytscha; Larson et al. 2014a). Shallow population structure often results in the inability to identify management units in MSA—severely limiting the value of genetic tools for fisheries management. One approach to resolving fine-scale population structure is by selecting panels of hundreds of highly informative markers for MSA from thousands of newly discovered single nucleotide polymorphisms (SNPs). While complete genome assemblies are becoming increasingly available for salmonid species (e.g., Chinook salmon, Christensen et al. 2018; Atlantic salmon, Lien et al. 2016), their utility and cost effectiveness for management applications is less than panels of tens to hundreds of genetic markers.

In recent years, populations of Chinook salmon have been declining in West Cook Inlet, reflecting the general trend across Alaska (Hollowell et al. 2013). During 2008–2016, escapement goals were not achieved for many populations in the area including Alexander Creek (9 of 9 years), Chuitna River (5 of 9 years), Lewis River (9 of 9 years), Talachulitna River (3 of 9 years), and Theodore River (9 of 9 years; Munro and Volk 2017). Due to failures to meet escapement goals, severe Chinook salmon restrictions were enacted on commercial fisheries; sport fisheries have been closed since 2011 on the Theodore, Lewis and Chuitna rivers, and the area had greatly reduced subsistence harvests (Shields and Frothingham 2018).

Chinook salmon have historically made up approximately half of the Tyonek subsistence harvest; however, the Tyonek Chinook salmon catch declined by roughly 60% between 2004 and

2012 (Shields and Dupuis 2013). The subsistence fishery has failed to meet amounts necessary for subsistence in recent years (ADF&G 2013), and residents are fishing longer and relying more upon other salmon species to meet their subsistence needs (Jones and Koster 2018). Chinook salmon caught in the Tyonek subsistence fishery are believed to originate from streams in northwestern Cook Inlet and the Susitna/Yentna river system. Major systems in this region (Beluga, Theodore, Lewis, and Chuitna rivers) all have regulatory restrictions on harvests due to recent low returns, and 6 Chinook salmon stocks in the Northern District of Cook Inlet have been designated as *stocks of concern* by the Alaska Board of Fisheries. Compounding these issues is the fact that it is difficult to differentiate populations on the coast of West Cook Inlet from populations in the upper Yentna River using the current genetic baseline (Barclay and Habicht 2015).

The Alaska Department of Fish and Game (ADF&G) recommended a comprehensive program to estimate stock-specific marine harvests of Chinook salmon in mixed stock fisheries of Cook Inlet using MSA and CWT (ADF&G Chinook Salmon Research Team 2013). Additional sampling of West Cook Inlet populations and development of markers that could differentiate among populations or groups of populations (stocks) in the area would improve the resolution beyond the existing MSA baselines in use at that time. Distinguishing upper Yentna River populations (Upper Yentna stock) from the populations on the coast of West Cook Inlet (West Cook Inlet stock) would improve assessment of the effect of subsistence and commercial harvests on the less abundant West Cook Inlet stock. Combining estimates of stock-specific harvests with escapement estimates on the contributing rivers would enable estimates of total run, harvest rates, and more accurate brood tables. Ultimately, improved estimates of total run and productivity would facilitate better escapement goals and further the mission of managing area fisheries on the sustained yield principle. Without the ability to separate these stocks, uncertainty remains regarding the portions of the harvest assigned to the West Cook Inlet stock and the more abundant Upper Yentna stock.

The Alaska Sustainable Salmon Fund funded research to improve ADF&G's ability to separate stocks of Chinook salmon from northwestern Cook Inlet. Specifically, the Alaska Sustainable Salmon Fund Project number 44914 (Enhanced monitoring of metapopulations of Chinook salmon in Western Cook Inlet and Western Alaska using mapped DNA markers), a collaboration between the University of Washington and ADF&G, sought to 1) develop a linkage map (an ordering and spacing of genetic markers along chromosomes) of Chinook salmon that incorporates variation from Alaska populations; 2) identify novel informative markers for MSA in northwestern Cook Inlet; and 3) utilize the linkage map to optimize the development of marker panels for use in Cook Inlet and Western Alaska. This report describes the identification of markers for panel development and subsequent use in MSA in Cook Inlet (Objective 2).

#### **OBJECTIVES**

Identify genetic markers that can differentiate populations or population groups of Chinook salmon from northwestern Cook Inlet and the adjacent Susitna/Yentna river system for panel development and subsequent use in MSA.

#### **METHODS**

#### EXPERIMENTAL DESIGN AND SELECTION OF COLLECTIONS FOR ANALYSIS

We selected 5 populations to use in the identification of informative markers for mixed stock analysis (MSA) in Cook Inlet; these populations were chosen based on their production, importance to subsistence fisheries, and shallow genetic structure based upon a set of 39 SNPs in the legacy baseline (Barclay and Habicht 2015). Four populations from West Cook Inlet were selected for analysis (Chuitna River, Coal Creek, Theodore River and Alexander Creek) along with 1 population from the Susitna/Yentna river system (Talachulitna River). The Chuitna River is the southernmost of the populations selected for analysis and enters Cook Inlet near the village of Tyonek. Coal Creek is a tributary of Beluga Lake that drains into Beluga River, the next major tributary north of the Chuitna. Theodore River is the next tributary north of Beluga River, is a low-gradient system and has headwaters near the headwaters of Talachulitna River. Alexander Creek is a low-gradient system that enters Cook Inlet near the mouth of the Susitna River. The Talachulitna River drains a series of tributary lakes and creeks and enters the Skwenta River, a tributary of the Yentna River. Fifty-six and 57 individuals/population were selected for sequencing (Table 1; Figure 1).

#### COLLECTION AND FILTERING OF SEQUENCE DATA

#### **Sequence Acquisition**

We prepared libraries for restriction-site associated DNA (RAD) sequencing following the protocols of Larson et al. (2014b). The restriction enzyme *SbfI* was used to digest the DNA from selected individuals, and *SbfI*-specific Illumina linkers—each containing a unique barcode—were ligated to each digested DNA sample as described in Miller et al. (2012). Individual samples were pooled into 3 libraries each containing 96 individuals. For each sequencing lane, a 12bp (6bp unique barcode plus 6bp *SbfI* site) sequence was used to uniquely identify reads belonging to the multiplexed individuals. Each library was assessed for quality and concentration using a Bioanalyzer DNA 1000 kit (Agilent Technologies, Santa Clara, California), and final concentration was determined by the Bioanalyzer software (Agilent Technologies Clara, California). Ten nanomoles of each library in EB (Qiagen, Valencia, California) and 0.1% Tween 20 were sequenced at the University of Oregon High Throughput Sequencing Facility using the Illumina HiSeq2000 producing 100 bp single-end reads. A second round of sequencing was used to equalize numbers of retained reads among individuals after titrating DNA concentrations.

#### Stacks Protocol

Bioinformatic analyses including Perl scripts and the Stacks pipeline (Catchen et al. 2013) were used to demultiplex sequence data, call genotypes, and filter loci and individuals for missing data. We used Stacks v1.24 and the following programs and standard parameter values to demultiplex and call genotypes: process\_radtags (-e sbfI -c -r -q -E phred33 --filter\_illumina -i gzfastq -t 94), ustacks (-m 2 -M 2 -p 4 -r --model\_type bounded --bound\_low 0 --bound\_high 0.05), sstacks (stacks were referenced to a catalog based on linkage map catalog described above after adding 4 individuals from each of the 5 populations), and populations (-s -r 0.5 -p 5 -a 0.05 --fstats --genepop --plink --structure). These parameter settings had the effects of removing any reads with uncalled bases or low quality scores and aligning reads with a maximum distance of 2

nucleotides between stacks and minimum depth of coverage of 2. We used the bounded SNP model with an upper error rate bound of 0.05. To ensure that loci were called the same name as used in the linkage map, we built upon the map catalog while incorporating any novel variants from these 5 populations. The *populations* settings ensured that genotypes were scored for only those loci present in all populations, observed in half of all individuals within a population and with a minimum minor allele frequency of 0.05.

#### **Sequence Filtering**

We filtered genotype data to remove loci and individuals missing substantial amounts of data. Loci and individuals missing 25% or more of their genotypic data were filtered with the program plink v1.9 (Chang et al. 2015). We quantified the genotyping rate as the percent of the total number of possible individual, locus-specific genotypes that were called at each filtering step. We tested for conformance to Hardy-Weinberg expectations using exact tests in plink and removed loci with *p*-values < 0.05 in 3 or more populations after applying the suggested mid-*p* adjustment to improve power with large datasets (Graffelman and Moreno 2013). Lastly, we selected a single SNP from each RAD tag for subsequent analyses. A *genepop* file (Rousset 2008) of final filtered data was written out of plink for subsequent analyses in R (R Core Team 2018).

## EXAMINATION OF POPULATION STRUCTURE AND SELECTION OF MARKERS FOR PANEL DEVELOPMENT

#### **Examination of Population Structure**

We visualized genetic structure with individual-based principal component analysis (PCA). We examined PCAs for the same individuals that passed the missing data filter using 3 marker sets: (1) the 39 of the original 42 SNPs from the legacy baseline that were variable in Cook Inlet, (2) the entire dataset after filtering, and (3) the subset of SNPs identified for panel development (described below).

#### Estimates of $F_{ST}$ and Weighting of SNPs for Panel Development

We estimated  $F_{\rm ST}$  values based upon Weir and Cockerham (1984) to assess variation among populations for each SNP that passed filters to identify markers for panel development. We estimated  $F_{\rm ST}$  values among all populations, between each population and the remaining 4, and among the 3 populations (Chuitna, Alexander and Theodore) that exhibited the least structure and clustered together in PCAs. We ranked each SNP based upon these  $F_{\rm ST}$  estimates and selected a panel of 500 to maximize divergence among populations with the following weighting:

- (1) 300 SNPs were selected based upon  $F_{ST}$  among the Chuitna, Alexander, and Theodore populations.
- (2) 100 SNPs were selected based upon  $F_{ST}$  between Talachulitna and the remaining 4 populations.
- (3) 100 SNPs were selected based upon  $F_{ST}$  between Coal and the remaining 4 populations.

Lastly, we located each SNP identified for panel development on the combined Washington-Alaska linkage map (McKinney et al. *In press*) to characterize their distribution on the genome and identify putative genomic hotspots where divergence among Cook Inlet populations is greatest.

#### **Examination of Likelihood Profiles**

We also examined likelihood profiles for each population by calculating the self-assignment probability for each individual within populations. The likelihood of each individual's genotype originating from all populations based on leave-one-out population allele frequencies was calculated following the methods of gsi\_sim (Anderson et al. 2008). These genotype likelihoods were summarized to the population level to determine the probability of individuals from a population being assigned back to that population. We visualized these probabilities as a matrix to better understand self-assignment of individuals back to their population of origin, and to gain insight into potential misallocation in fishery mixtures for the original 39 SNPs available from the legacy baseline (Barclay and Habicht 2015) and the subset of SNPs identified for panel development. We did not estimate likelihoods based upon the entire, filtered RAD dataset (13,804 loci) due to computational limitations.

#### **Panel Development**

We combined the 500 SNPs selected for panel development and additional Taqman assay-based markers developed elsewhere for a final panel that would multiplex together using Genotyping-in-Thousands by sequencing (GTseq) chemistry (Campbell et al. 2015). These additional Taqman assays included 6 SNPs from the existing Cook Inlet baseline (Ots\_HGFA-446, Ots\_HSP90B-385, Ots\_il-1racp-166, Ots\_ins-115, Ots\_ZNF330-181). Panel development included filtering out loci with (1) SNPs in a required primer region of each RAD amplicon (bases 1-20 and 75-94 of the 94 bp amplicons); (2) amplicons with repeated elements that would amplify multiple regions of the genome with the online software RepeatMasker (Smit et al. 2018); and (3) amplicons that generated excessive sequence to the detriment of remaining amplicons in multiple rounds of panel testing.

#### RESULTS

#### COLLECTION AND FILTERING OF SEQUENCE DATA

A total of 376,355,791 retained reads were processed through the Stacks pipeline (Table 1, Figure 2). The 5 populations had similar quality of sequence data, averaging 75M retained reads while individuals averaged 1.3M retained reads. After processing sequence data through the Stacks pipeline, 33,407 loci were genotyped for the 283 individuals at an overall genotyping rate of 72.4% (Table 2). Filtering for missing data at the 25% threshold resulted in 20,133 loci (60.3% of the 33,407 loci); just 1 individual was removed for missing data (99.6% were retained). A total of 3,761 loci were removed for failing to conform to Hardy-Weinberg expectations (resulting in 16,372 retained loci). After filtering for a single SNP/amplicon, 13,804 loci genotyped for 282 individuals were available for subsequent analyses at an overall genotyping rate of 92.9% (Table 2).

## EXAMINATION OF POPULATION STRUCTURE AND SELECTION OF MARKERS FOR PANEL DEVELOPMENT

#### **Examination of Population Structure**

PCAs based upon the 3 marker sets depicted markedly different patterns of population genetic structure (Figure 3). The legacy set of 39 SNPs previously used in mixed stock analysis indicated no structure among populations; all variation was based upon individual genotypic variability.

The PCA based upon the entire RAD dataset of 13,804 SNPs suggested divergence of Coal Creek and the Talachulitna River from the remaining 3 populations which all clustered closely together. The 500 SNPs selected for panel development achieved the greatest divergence among populations, with the Chuitna River diverging from Theodore River and Alexander Creek, but still little segregation between those 2 drainages.

#### Estimates of $F_{ST}$ and Results of Panel Development

Estimates of  $F_{\rm ST}$  exhibited substantial contrast among loci at differentiating populations.  $F_{\rm ST}$  among all populations averaged 0.003 for the entire RAD dataset; 24 loci had an  $F_{\rm ST} > 0.05$  (Figure 4). Distributions of overall  $F_{\rm ST}$  for the 3 marker sets were markedly different, with the 500 selected for panel development (Appendix 1) exhibiting the greatest divergence among populations (Figure 5). Of the 500 selected for panel development, primers were able to be designed for 183 (37%) that multiplexed well together. Of these final SNPs in the panel, 89 were included to differentiate Chuitna-Theodore-Alexander (mean  $F_{\rm ST} = 0.048$ ), 44 to differentiate Coal from other populations (mean  $F_{\rm ST} = 0.073$ ), and 50 to differentiate Talachulitna from other populations (mean  $F_{\rm ST} = 0.079$ ; Table 3).

A majority of the 500 selected for panel development (461; Appendix 1) and 171 of the 183 loci included in the final panel were located on the linkage map. Loci in the final panel were located on all linkage groups, ranging from 1 to 11 loci/linkage group (mean = 5; Table 4) and broadly distributed throughout and among linkage groups (Figure 6).

#### **Examination of Likelihood Profiles**

Likelihood profiles indicated high uncertainty in genetic assignment to population of origin for the 39 current SNPs, and greatly improved assignment ability with the 500 loci selected for panel development. Theodore River and Alexander River exhibited a greater likelihood of assigning to one another than to themselves with the original 39 SNPs (Figure 7).

#### DISCUSSION

We applied RAD sequencing to discover genetic markers to differentiate 5 closely related populations of Chinook salmon important to commercial, sport, and subsistence fisheries in Cook Inlet. We selected 500 loci from a filtered dataset of 13,804 loci to maximize divergence among these populations and evaluated population structure and assignment likelihood profiles for existing and final RAD marker sets. No structure among populations was apparent based upon the 39 legacy SNPs while the 500 selected for panel development differentiated populations, although Alexander and Theodore rivers still exhibited shallower structure than the other 3 populations. It is likely that gene flow among these shallow-gradient, coastal populations is more likely than with Coal Creek above Beluga Lake or Talachulitna River much farther up the Susitna River system.

We selected loci based upon the fixation index  $F_{\rm ST}$  and weighted the numbers of SNPs selected for panel development by the structure we observed among populations to maximize differentiation among populations. Other approaches to selecting genetic markers for MSA have been suggested, notably random forest (i.e., RF; Sylvester et al. 2018) and backwards elimination locus selection (i.e., BELS; Bromaghin 2008). We have examined the utility of RF for marker selection and found it to be sensitive to the size of marker panel chosen for analysis, often resulting in little contrast in estimated marker power for MSA among loci (ADF&G, unpublished

data). BELS has been shown to be effective at identifying subsets of markers for MSA but is too computationally costly for large datasets such as ours (ADF&G, unpublished data). We previously observed high concordance between  $F_{ST}$  and utility in MSA when selecting a subset of 24 SNPs from a panel of 96 for Bristol Bay sockeye salmon applications (ADF&G, unpublished data). Each markers' utility in MSA measured with the program BAYES (Pella and Masuda 2001) used by ADF&G exhibited nearly perfect correlation with  $F_{ST}$  in the selection of the 24 SNPs for Bristol Bay applications. Given that context, we used  $F_{ST}$  to select loci for panel development and gave the populations exhibiting the least structure the greatest weight in terms of numbers of loci (Storer et al. 2012).

We expect this panel will be a very useful genetic tool for managing salmon fisheries in Cook Inlet and will improve our understanding of Chinook salmon in the region. While baseline evaluation tests incorporating other Cook Inlet populations would provide a more complete assessment of the new marker sets ability for mixed stock analysis, the leave-one-out likelihood profiles provide a measure of the improvement expected from the new marker set. The final panel incorporating markers from this discovery effort has recently been used to improve the baseline for Cook Inlet Chinook salmon, and preliminary baseline evaluation tests suggest improved resolution among stocks in the region. New stocks are now identifiable in MSA within Cook Inlet and all stocks will be estimated more accurately and precisely with the addition of hundreds of genetic markers. The previous Northwest/Yentna is now split into West and Yentna, a new Deshka group is now separate from the Susitna group that previously included it, and the Kenai/Kasilof group is now split into Kenai Tributaries, Kenai Mainstem and Kasilof Mainstem (Figure 8; ADF&G, unpublished data). The ability to identify these stocks will improve stock assessment so that fisheries in the region can be better managed to maximize sustainable yield, and, hopefully, improve returns and remove stock of concern status for those populations currently designated. We expect MSA applications of this new baseline to include reanalysis of subsistence harvests in the Tyonek area with improved resolution and development of a genetic mark-recapture estimate of abundance for the Susitna River based upon weir counts and MSA estimates for the Deshka River stock.

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### TABLES AND FIGURES

Table 1.—Summary of populations of Chinook salmon from Northwest Cook Inlet sequenced to discover markers useful for mixed stock analysis including ADF&G collection code, latitude, longitude, collection date(s), numbers of individuals sequenced (n), total retained reads, range of retained reads among individuals, and mean, standard deviation (SD) and coefficient of variation (CV) of reads/individual.

Population	ADF&G code(s)	Lat Long	Collection Date(s)	n	Retained reads	Range	Reads/Individual	SD	CV (%)
Chuitna	KCHUI09	61.14 -151.44	7/14/2009	57	73,568,982	643,684–1,757,213	1,290,684	251,940	19.5
Coal	KCOAL10/11	61.58 -151.77	7/21/2010 and 7/19/2011	56	74,250,630	847,358-1,834,086	1,325,904	223,883	16.9
Theodore	KTHEO12	61.44 -151.09	6/4/2012	56	72,798,733	764,365–1,847,324	1,299,977	225,188	17.3
Alexander	KSUCKCR11/12	61.60 -150.77	7/21/2011 and 7/18/2012	57	77,099,524	756,514–1,995,350	1,352,623	253,193	18.7
Talachulitna	KTALA08/10	61.69 –151.49	7/28/2008 and 7/13/2010	57	78,637,922	828,762-1,850,292	1,379,613	251,936	18.3
Total				283	376,355,791	643,684–1,995,350	1,329,879	242,283	18.2

Table 2.—Numbers of loci and individuals (and percent of starting total) remaining after 4 stages of filtering: initial data from stacks pipeline, after filtering for 25% missing data by loci and then individuals, after removing loci that failed to conform to HWE expectations, and after selecting a single SNP from each RAD tag. Also included is the overall genotyping rate at each stage.

	Loci		Indivi	duals	
Stage	Number	Percent	Number	Percent	Genotyping rate
Initial from stacks	33,407	100	283	100	72.4
Missing data	20,133	60.3	282	99.6	92.4
HWE expectations	16,372	49.0	282	99.6	92.7
Single SNP/RAD tag	13,804	41.3	282	99.6	92.9

Table 3.—Number of amplicons from the 500 selected for panel development that were successfully incorporated into the panel and their mean  $F_{ST}$  by purpose. The 3 purposes were to split apart the cluster of Chuitna and Theodore rivers and Alexander Creek (Cluster), differentiate Coal Creek from other populations (Coal) and to differentiate Talachulitna River from other populations (Tala).

Purpose	# amplicons	Mean $F_{ST}$ For Purpose
Cluster	89	0.048
Coal	44	0.073
Tala	50	0.079
Total/Average	183	0.067

Table 4.—Number of amplicons from the 500 selected for panel development that were successfully incorporated into the panel and are located on the linkage map by linkage group.

Linkage group	No. amplicons from selected 500
Ots01	8
Ots02	4
Ots03	5
Ots04	5
Ots05	4
Ots06	4
Ots07	7
Ots08	5
Ots09	7
Ots10	8
Ots11	8
Ots12	11
Ots13	3
Ots14	8
Ots15	7
Ots16	3
Ots17	1
Ots18	2
Ots19	5
Ots20	5
Ots21	3
Ots22	4
Ots23	2
Ots24	2
Ots25	7
Ots26	5
Ots27	3
Ots28	8
Ots29	6
Ots30	4
Ots31	7
Ots32	2
Ots33	6
Ots34	2
Mean	5
Total	171

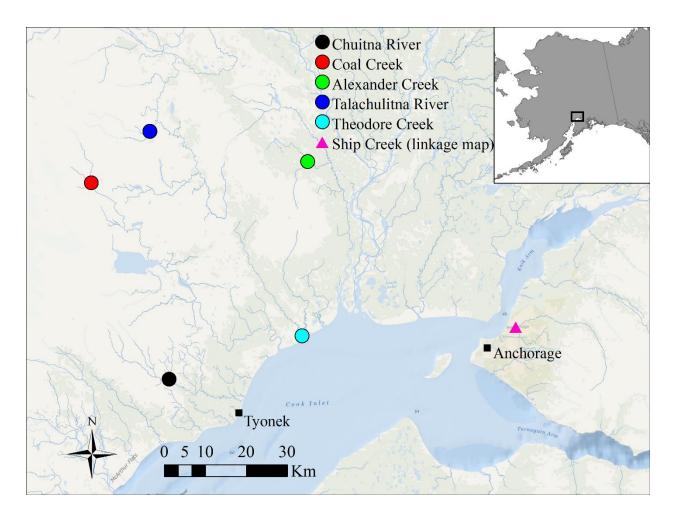


Figure 1.—The location of 5 populations of Chinook salmon used to identify markers for panel development for MSA in Cook Inlet (circles). The families used to construct the combined Washington-Alaska linkage map originated from Ship Creek (triangle).

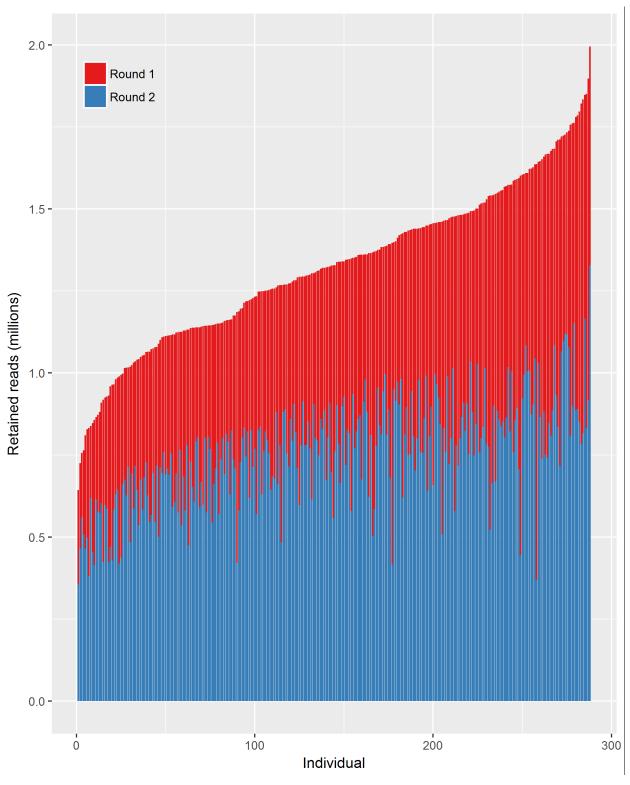


Figure 2.—Number of retained reads by round of sequencing for individuals from 5 Cook Inlet populations of Chinook salmon used to identify markers for panel development for MSA in Cook Inlet.

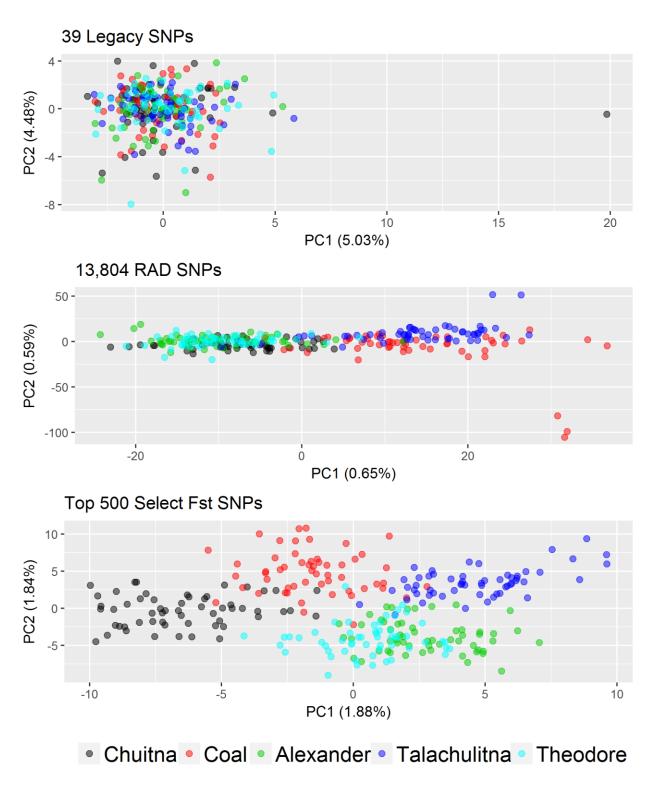


Figure 3.–Individual-based principal coordinate analysis of 282 individuals from 5 populations of Cook Inlet Chinook salmon used to identify markers for panel development for MSA in Cook Inlet by marker set. Marker sets include the 39 legacy SNPs in the existing baseline (top), the 13,804 RAD SNPs of the final filtered dataset (middle), and 500 SNPs selected for panel development based upon  $F_{\rm ST}$  (bottom).

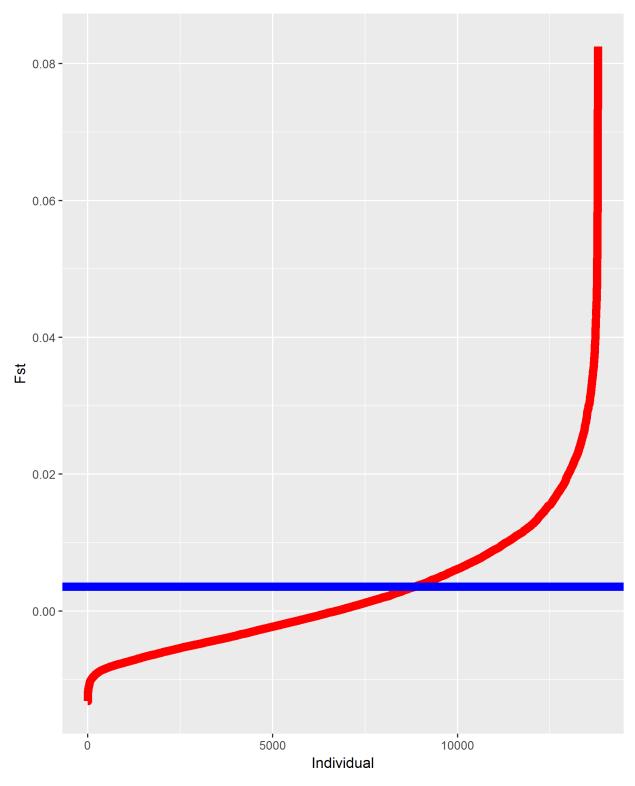


Figure 4.–  $F_{ST}$  estimated among all populations (red line) for 13,804 SNPs that passed filters and average  $F_{ST}$  among all SNPs (blue line, 0.003).

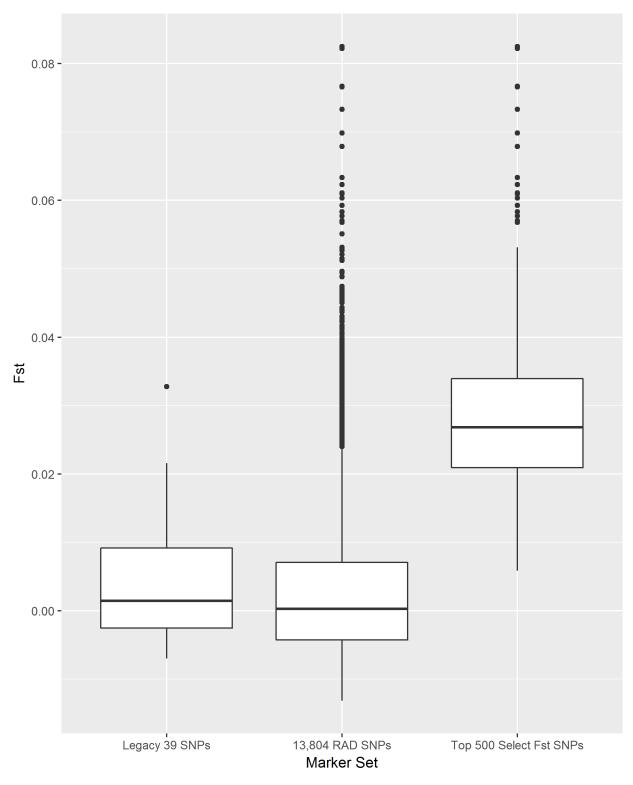


Figure 5.—Distribution of overall  $F_{\rm ST}$  among 5 populations of Cook Inlet Chinook salmon used to identify markers for panel development for MSA in Cook Inlet by marker set. Marker sets include the 39 legacy SNPs common to the existing baseline, the 13,804 RAD SNPs of the final filtered dataset and 500 SNPs selected for panel development.

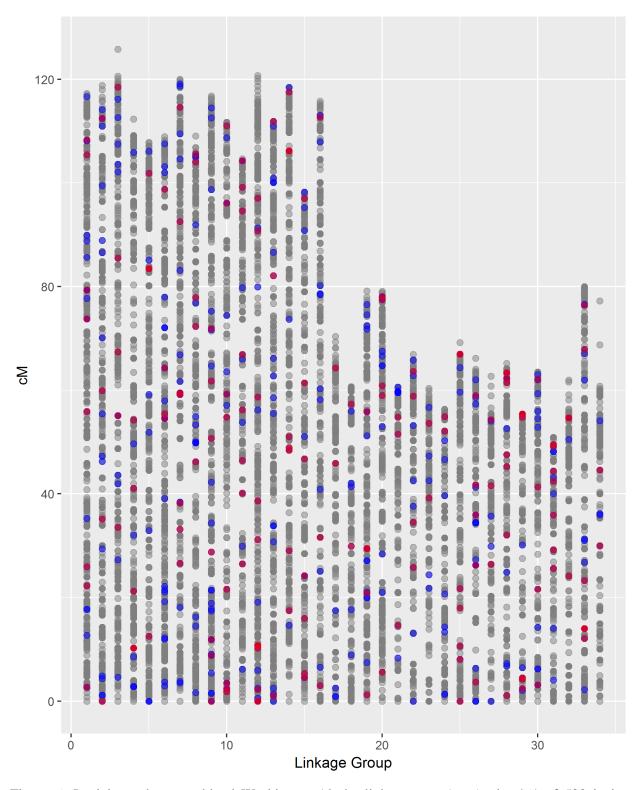


Figure 6.—Loci located on combined Washington-Alaska linkage map (grey), the 461 of 500 loci selected for panel development (blue) located on the linkage map, and the 171 incorporated in the final panel (red).

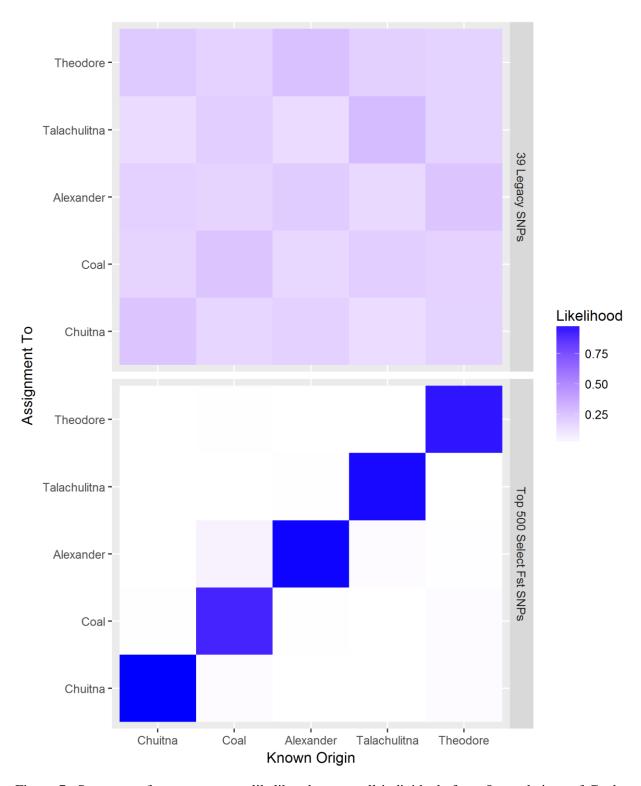


Figure 7.—Summary of mean genotype likelihood among all individuals from 5 populations of Cook Inlet Chinook salmon based upon the 39 legacy SNPs in the existing baseline (top) and 500 SNPs selected for panel development based upon  $F_{\rm ST}$  (bottom). Probabilities off the diagonal indicate uncertainty in genetic assignment and provide indications of potential misallocation in mixed stock analysis.

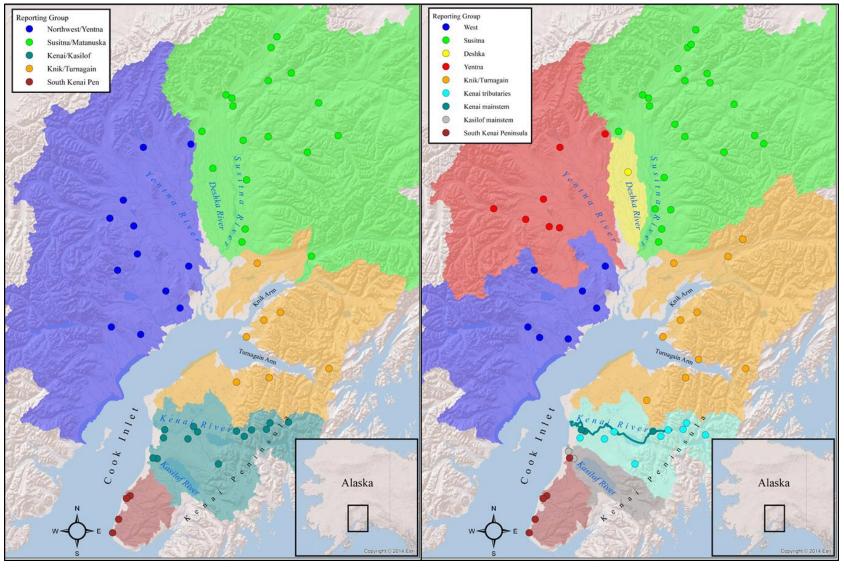


Figure 8.—Location and reporting group affiliation for 55 populations genotyped for the legacy 39 SNPs (left panel) and 66 populations genotyped for 414 SNPs (right panel) that include SNPs developed to better differentiate populations of Cook Inlet Chinook salmon (Appendix A).

# APPENDIX A: SUMMARY OF 500 AMPLICONS SELECTED FOR PANEL DEVELOPMENT

Appendix A1.—Summary of the 500 amplicons selected for panel development including catalog ID, whether the amplicon was included in the final panel, purpose, linkage group, and position in centiMorgans (cM) for those amplicons located on the linkage map, and four  $F_{\rm ST}$  values: among all populations (Overall), between Coal Creek and other populations (Coal), between Talachulitna River and other populations (Tala), and among the Chuitna and Theodore rivers and Alexander Creek (Cluster).

Catalog ID         Included in final panel         Purpose         LG         cw         Overall         Coul         Coulster         Cutster         Cutster		. ,,						`	
418         Yes         Cluster         Ots26         59.01         0.035         0.012         -0.006         0.055           464         No         Coal         Ots19         19.935         0.026         0.071         -0.006         -0.005           839         No         Tala         Ots01         19.935         0.026         -0.001         0.062         0.002           904         No         Tala         Ots01         66.057         0.030         0.012         0.002         -0.009           964         No         Tala         Ots01         66.057         0.032         0.010         -0.005         0.001           1143         No         Tala         Ots02         47.24         0.028         0.000         0.069         0.003           1565         No         Cluster         Ots13         110.966         0.032         0.001         -0.005         0.061           1921         No         Cluster         Ots08         91.932         0.032         0.006         0.004         0.036           2844         No         Coal         Ots08         91.932         0.033         0.086         0.012         -0.003           3828	Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
464         No         Coal         Ots19         19.935         0.026         0.071         -0.006         -0.005           839         No         Tala         Ots09         0         0.026         -0.001         0.062         0.002           904         No         Tala         Ots11         66.057         0.030         0.012         0.002         0.0071         -0.007           964         No         Tala         Ots01         85.593         0.024         -0.002         0.071         -0.007           1143         No         Tala         Ots02         47.24         0.028         0.000         0.069         0.003           1565         No         Cluster         Ots13         110.966         0.032         0.010         -0.005         0.061           1921         No         Cluster         NA         NA         0.019         -0.006         0.004         0.036         0.034         0.036         0.012         -0.003           2844         No         Coal         Ots03         11.15         0.024         -0.002         0.074         -0.003           3283         No         Tala         Ots02         1.15         0.024 <td< td=""><td>392</td><td>Yes</td><td>Cluster</td><td>Ots21</td><td>54.794</td><td>0.022</td><td>-0.004</td><td>0.000</td><td>0.048</td></td<>	392	Yes	Cluster	Ots21	54.794	0.022	-0.004	0.000	0.048
839         No         Tala         Ots09         0         0.026         -0.001         0.062         0.002           904         No         Tala         Ots11         66.057         0.030         0.012         0.062         0.009           964         No         Tala         Ots01         85.593         0.024         -0.002         0.071         -0.007           1143         No         Tala         Ots02         47.24         0.028         0.000         0.006         0.004           1565         No         Cluster         Ots13         110.966         0.032         0.010         -0.005         0.061           1921         No         Cluster         NA         NA         0.019         -0.006         0.004         -0.032           2844         No         Coal         Ots08         91.932         0.033         0.086         0.012         -0.003           2868         Yes         Coal         Ots01         11.59         0.024         -0.002         0.074         -0.008           3358         No         Tala         Ots02         11.59         0.022         0.005         0.058         -0.005           3729         No<	418	Yes	Cluster	Ots26	59.01	0.035	0.012	-0.006	0.055
904         No         Tala         Ots11         66.057         0.030         0.012         0.062         0.009           964         No         Tala         Ots01         85.593         0.024         -0.002         0.071         -0.007           1143         No         Tala         Ots02         47.24         0.028         0.000         0.069         0.003           1565         No         Cluster         Ots13         110.966         0.032         0.010         -0.005         0.061           1921         No         Cluster         NA         NA         0.019         -0.006         0.004         0.036           2844         No         Coal         Ots08         91.932         0.033         0.086         0.012         -0.003           2868         Yes         Coal         Ots013         111.909         0.034         0.080         0.038         -0.007           3283         No         Tala         Ots02         1.15         0.024         -0.002         0.074         -0.008           3358         No         Tala         Ots09         11.891         0.026         0.078         0.002         -0.005           3729	464	No	Coal	Ots19	19.935	0.026	0.071	-0.006	-0.005
964         No         Tala         Ots01         85.593         0.024         -0.002         0.071         -0.007           1143         No         Tala         Ots02         47.24         0.028         0.000         0.069         0.003           1565         No         Cluster         Ots13         110.966         0.032         0.010         -0.005         0.061           1921         No         Cluster         NA         NA         0.019         -0.006         0.004         0.032           2844         No         Coal         Ots08         91.932         0.033         0.086         0.012         -0.003           2868         Yes         Coal         Ots13         111.909         0.034         0.080         0.038         -0.007           3283         No         Tala         Ots04         105.88         0.020         0.005         0.058         -0.005           3358         No         Tala         Ots04         105.88         0.020         0.005         0.058         -0.005           3729         No         Coal         Ots06         11.891         0.026         0.078         0.021         -0.006           4830	839	No	Tala	Ots09	0	0.026	-0.001	0.062	0.002
1143         No         Tala Cluster         Ots02 Ots13         47.24         0.028         0.000         0.069         0.003           1565         No         Cluster         Ots13         110.966         0.032         0.010         -0.005         0.061           1921         No         Cluster         NA         NA         0.019         -0.006         0.004         0.036           2844         No         Coal         Ots08         91.932         0.033         0.086         0.012         -0.003           2868         Yes         Coal         Ots13         111.909         0.034         0.080         0.038         -0.007           3283         No         Tala         Ots02         1.15         0.024         -0.002         0.074         -0.008           3358         No         Tala         Ots04         115.88         0.020         0.005         0.058         -0.005           3729         No         Coal         Ots04         11.891         0.026         0.078         0.002         -0.006           3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.054 <td< td=""><td>904</td><td>No</td><td>Tala</td><td>Ots11</td><td>66.057</td><td>0.030</td><td>0.012</td><td>0.062</td><td>0.009</td></td<>	904	No	Tala	Ots11	66.057	0.030	0.012	0.062	0.009
1565	964	No	Tala	Ots01	85.593	0.024	-0.002	0.071	-0.007
1921         No         Cluster         NA         NA         0.019         -0.006         0.004         0.036           2844         No         Coal         Ots08         91.932         0.033         0.086         0.012         -0.003           2868         Yes         Coal         Ots13         111.909         0.034         0.080         0.038         -0.007           3283         No         Tala         Ots02         1.15         0.024         -0.002         0.074         -0.008           3358         No         Tala         Ots04         105.88         0.020         0.005         0.058         -0.005           3729         No         Coal         Ots09         11.891         0.026         0.078         0.002         -0.006           3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.036           3884         Yes         Tala         Ots26         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots39         114.495         0.033         0.008         0.010         0.054           4299	1143	No	Tala	Ots02	47.24	0.028	0.000	0.069	0.003
2844         No         Coal         Ots08         91.932         0.033         0.086         0.012         -0.003           2868         Yes         Coal         Ots13         111.909         0.034         0.080         0.038         -0.007           3283         No         Tala         Ots02         1.15         0.024         -0.002         0.074         -0.008           3358         No         Tala         Ots04         105.88         0.020         0.005         0.058         -0.005           3729         No         Coal         Ots09         11.891         0.026         0.078         0.002         -0.006           3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.036           4000         Yes         Cluster         Ots32         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots04         2.9971         0.027         -0.001         0.054           4299         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4502         Ye	1565	No	Cluster	Ots13	110.966	0.032	0.010	-0.005	0.061
2868         Yes         Coal         Ots13         111.909         0.034         0.080         0.038         -0.007           3283         No         Tala         Ots02         1.15         0.024         -0.002         0.074         -0.008           3358         No         Tala         Ots04         105.88         0.020         0.005         0.058         -0.005           3729         No         Coal         Ots09         11.891         0.026         0.078         0.002         -0.006           3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.036           3884         Yes         Tala         Ots26         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots34         29.971         0.057         -0.05         0.054         0.056           4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4502         Yes         Cluster         Ots16         78.595         0.021         -0.004         -0.007         0.035	1921	No	Cluster	NA	NA	0.019	-0.006	0.004	0.036
3283         No         Tala         Ots02         1.15         0.024         -0.002         0.074         -0.008           3358         No         Tala         Ots04         105.88         0.020         0.005         0.058         -0.005           3729         No         Coal         Ots09         11.891         0.026         0.078         0.002         -0.006           3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.036           3884         Yes         Tala         Ots26         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots34         29.971         0.057         -0.005         0.054         0.056           4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4299         No         Cluster         Ots16         78.595         0.021         -0.007         -0.007         0.048           4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         -0.007         0.003           <	2844	No	Coal	Ots08	91.932	0.033	0.086	0.012	-0.003
3358         No         Tala         Ots04         105.88         0.020         0.055         0.058         -0.005           3729         No         Coal         Ots09         11.891         0.026         0.078         0.002         -0.006           3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.036           3884         Yes         Tala         Ots26         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots34         29.971         0.057         -0.005         0.054         0.056           4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4299         No         Cluster         Ots16         78.595         0.021         -0.004         -0.007         0.048           4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         0.007         0.035           4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004	2868	Yes	Coal	Ots13	111.909	0.034	0.080	0.038	-0.007
3729         No         Coal         Ots09         11.891         0.026         0.078         0.002         -0.006           3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.036           3884         Yes         Tala         Ots26         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots34         29.971         0.057         -0.005         0.054         0.056           4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4299         No         Cluster         Ots16         78.595         0.021         -0.004         -0.007         0.048           4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         -0.007         0.035           4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036	3283	No	Tala	Ots02	1.15	0.024	-0.002	0.074	-0.008
3830         Yes         Cluster         Ots26         41.737         0.034         0.031         -0.005         0.036           3884         Yes         Tala         Ots26         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots34         29.971         0.057         -0.005         0.054         0.056           4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4299         No         Cluster         Ots16         78.595         0.021         -0.004         -0.007         0.048           4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         -0.007         0.035           4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.035	3358	No	Tala	Ots04	105.88	0.020	0.005	0.058	-0.005
3884         Yes         Tala         Ots26         3.707         0.022         0.001         0.061         -0.001           4000         Yes         Cluster         Ots34         29.971         0.057         -0.005         0.054         0.056           4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4299         No         Cluster         Ots16         78.595         0.021         -0.004         -0.007         0.048           4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         -0.007         0.035           4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054	3729	No	Coal	Ots09	11.891	0.026	0.078	0.002	-0.006
4000         Yes         Cluster         Ots34         29.971         0.057         -0.005         0.054         0.056           4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4299         No         Cluster         Ots16         78.595         0.021         -0.004         -0.007         0.048           4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         -0.007         0.035           4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots09         8.825         0.032         -0.002         0.085         -0.004	3830	Yes	Cluster	Ots26	41.737	0.034	0.031	-0.005	0.036
4025         No         Cluster         Ots09         114.495         0.033         0.008         0.010         0.054           4299         No         Cluster         Ots16         78.595         0.021         -0.004         -0.007         0.048           4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         -0.007         0.035           4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots09         8.825         0.032         -0.004         -0.005         0.054           5295         No         Coal         NA         NA         NA         0.025         0.068         0.007         -0.002	3884	Yes	Tala	Ots26	3.707	0.022	0.001	0.061	-0.001
4299         No         Cluster         Ots 16         78.595         0.021         -0.004         -0.007         0.048           4502         Yes         Cluster         Ots 25         66.944         0.012         -0.007         -0.007         0.035           4783         No         Tala         Ots 08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots 15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots 19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots 19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots 09         8.825         0.032         -0.002         0.085         -0.004           5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots 24         46.637         0.025         -0.006         0.010         0.049	4000	Yes	Cluster	Ots34	29.971	0.057	-0.005	0.054	0.056
4502         Yes         Cluster         Ots25         66.944         0.012         -0.007         -0.007         0.035           4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots09         8.825         0.032         -0.002         0.085         -0.004           5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           58	4025	No	Cluster	Ots09	114.495	0.033	0.008	0.010	0.054
4783         No         Tala         Ots08         105.051         0.029         -0.002         0.061         -0.004           4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots09         8.825         0.032         -0.002         0.085         -0.004           5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829 <td>4299</td> <td>No</td> <td>Cluster</td> <td>Ots16</td> <td>78.595</td> <td>0.021</td> <td>-0.004</td> <td>-0.007</td> <td>0.048</td>	4299	No	Cluster	Ots16	78.595	0.021	-0.004	-0.007	0.048
4809         No         Cluster         Ots15         90.78         0.027         0.000         0.023         0.036           5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots09         8.825         0.032         -0.002         0.085         -0.004           5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287 </td <td>4502</td> <td>Yes</td> <td>Cluster</td> <td>Ots25</td> <td>66.944</td> <td>0.012</td> <td>-0.007</td> <td>-0.007</td> <td>0.035</td>	4502	Yes	Cluster	Ots25	66.944	0.012	-0.007	-0.007	0.035
5020         No         Cluster         Ots19         76.512         0.016         -0.006         -0.002         0.036           5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots09         8.825         0.032         -0.002         0.085         -0.004           5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581 <td>4783</td> <td>No</td> <td>Tala</td> <td>Ots08</td> <td>105.051</td> <td>0.029</td> <td>-0.002</td> <td>0.061</td> <td>-0.004</td>	4783	No	Tala	Ots08	105.051	0.029	-0.002	0.061	-0.004
5164         No         Cluster         Ots19         19.935         0.023         -0.004         -0.005         0.054           5231         No         Tala         Ots09         8.825         0.032         -0.002         0.085         -0.004           5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195	4809	No	Cluster	Ots15	90.78	0.027	0.000	0.023	0.036
5231         No         Tala         Ots09         8.825         0.032         -0.002         0.085         -0.004           5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.005           7195	5020	No	Cluster	Ots19	76.512	0.016	-0.006	-0.002	0.036
5295         No         Coal         NA         NA         0.025         0.068         0.007         -0.002           5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776	5164	No	Cluster	Ots19	19.935	0.023	-0.004	-0.005	0.054
5444         No         Cluster         Ots24         46.637         0.025         -0.006         0.010         0.049           5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776         Yes         Tala         NA         NA         0.029         -0.006         0.072         -0.006	5231	No	Tala	Ots09	8.825	0.032	-0.002	0.085	-0.004
5667         Yes         Coal         Ots21         51.482         0.023         0.071         -0.006         -0.010           5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776         Yes         Tala         NA         NA         0.029         -0.006         0.072         -0.006	5295	No	Coal	NA	NA	0.025	0.068	0.007	-0.002
5823         No         Tala         Ots11         6.139         0.022         -0.003         0.058         -0.003           5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776         Yes         Tala         NA         NA         0.029         -0.006         0.072         -0.006	5444	No	Cluster	Ots24	46.637	0.025	-0.006	0.010	0.049
5829         No         Cluster         Ots12         5.986         0.024         -0.003         -0.002         0.051           6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776         Yes         Tala         NA         NA         0.029         -0.006         0.072         -0.006	5667	Yes	Coal	Ots21	51.482	0.023	0.071	-0.006	-0.010
6287         No         Tala         Ots21         59.781         0.022         0.009         0.063         -0.008           6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776         Yes         Tala         NA         NA         0.029         -0.006         0.072         -0.006	5823	No	Tala	Ots11	6.139	0.022	-0.003	0.058	-0.003
6581         No         Cluster         Ots13         1.334         0.030         -0.006         0.019         0.044           6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776         Yes         Tala         NA         NA         0.029         -0.006         0.072         -0.006	5829	No	Cluster	Ots12	5.986	0.024	-0.003	-0.002	0.051
6905         No         Coal         Ots22         53.192         0.046         0.065         -0.005         0.035           7195         No         Coal         Ots08         76.814         0.025         0.079         0.004         -0.008           7776         Yes         Tala         NA         NA         0.029         -0.006         0.072         -0.006	6287	No	Tala	Ots21	59.781	0.022	0.009	0.063	-0.008
7195 No Coal Ots08 76.814 0.025 0.079 0.004 -0.008 7776 Yes Tala NA NA 0.029 -0.006 0.072 -0.006	6581	No	Cluster	Ots13	1.334	0.030	-0.006	0.019	0.044
7776 Yes Tala NA NA 0.029 -0.006 0.072 -0.006	6905	No	Coal	Ots22	53.192	0.046	0.065	-0.005	0.035
	7195	No	Coal	Ots08	76.814	0.025	0.079	0.004	-0.008
7932 No Cluster Ots05 32.909 0.024 0.002 0.004 0.041	7776	Yes	Tala	NA	NA	0.029	-0.006	0.072	-0.006
	7932	No	Cluster	Ots05	32.909	0.024	0.002	0.004	0.041

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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
8142	No	Cluster	NA	NA	0.015	-0.004	-0.005	0.037
8210	No	Tala	Ots13	30.748	0.047	-0.002	0.120	-0.004
8524	No	Cluster	Ots20	64.761	0.021	0.008	-0.007	0.039
8628	No	Coal	Ots13	2.49	0.027	0.074	-0.005	-0.006
8662	Yes	Tala	Ots12	0.001	0.047	-0.007	0.059	0.038
8834	Yes	Tala	Ots01	105.45	0.029	0.003	0.085	-0.007
8948	No	Cluster	Ots16	80.187	0.014	-0.003	-0.006	0.034
9374	No	Cluster	Ots26	26.226	0.033	-0.003	0.006	0.064
9427	No	Cluster	Ots31	14.054	0.024	-0.006	0.017	0.039
9688	Yes	Tala	Ots09	11.892	0.049	-0.007	0.096	0.019
9970	Yes	Cluster	Ots25	8.08	0.025	0.015	0.000	0.041
10049	Yes	Cluster	Ots12	90.77	0.025	0.004	-0.002	0.046
10092	No	Tala	Ots04	2.827	0.033	-0.006	0.060	0.013
10112	No	Cluster	Ots13	0	0.032	0.021	-0.006	0.040
10481	Yes	Coal	Ots32	24.139	0.058	0.072	0.025	0.007
10678	No	Coal	Ots08	1.637	0.041	0.065	0.004	0.020
10724	No	Coal	Ots13	33.841	0.036	0.098	0.000	-0.005
11531	No	Cluster	Ots19	71.756	0.013	-0.005	-0.005	0.036
11735	No	Coal	Ots10	59.209	0.029	0.074	-0.002	0.005
11975	No	Cluster	Ots08	49.84	0.035	-0.002	0.000	0.072
12417	No	Cluster	Ots09	5.433	0.032	-0.006	0.012	0.057
12524	Yes	Coal	Ots14	106.182	0.021	0.059	-0.005	-0.006
12688	Yes	Tala	NA	NA	0.019	-0.004	0.063	-0.010
12985	No	Cluster	Ots25	66.944	0.020	0.013	-0.003	0.035
13045	Yes	Cluster	Ots29	4.488	0.024	-0.004	0.006	0.043
13171	Yes	Tala	NA	NA	0.020	-0.007	0.064	-0.010
13409	No	Tala	Ots16	6.516	0.038	-0.007	0.078	0.011
13435	Yes	Coal	Ots30	62.05	0.034	0.095	0.000	-0.009
13711	Yes	Cluster	Ots11	26.473	0.017	0.005	-0.006	0.034
13755	Yes	Cluster	Ots15	5.324	0.036	0.035	-0.003	0.036
13797	No	Tala	Ots02	88.916	0.031	-0.004	0.078	-0.008
13938	No	Cluster	Ots16	25.042	0.040	0.020	-0.005	0.062
13946	No	Cluster	Ots21	59.515	0.017	-0.002	-0.006	0.039
14092	Yes	Coal	Ots12	31.148	0.027	0.060	0.000	0.007
14123	No	Cluster	Ots15	51.058	0.037	0.047	-0.006	0.042
14470	No	Cluster	Ots07	3.488	0.017	0.008	-0.004	0.035
14490	No	Cluster	Ots30	62.006	0.027	-0.006	-0.004	0.060
14778	No	Cluster	Ots06	72.068	0.042	0.030	0.008	0.035
15274	No	Coal	Ots21	8.287	0.027	0.068	-0.002	0.001
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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
15287	Yes	Cluster	Ots28	45.293	0.017	-0.003	-0.006	0.038
15416	Yes	Tala	Ots04	10.214	0.029	0.002	0.060	-0.009
15859	Yes	Cluster	Ots14	29.009	0.026	0.000	0.005	0.050
15938	No	Cluster	Ots16	60.299	0.021	0.006	-0.006	0.041
16002	No	Cluster	Ots08	49.993	0.021	0.001	-0.001	0.041
16246	No	Cluster	Ots33	26.79	0.026	-0.004	0.019	0.036
16441	Yes	Cluster	Ots01	25.911	0.018	0.004	-0.007	0.037
16481	No	Cluster	Ots22	37.633	0.017	-0.005	0.006	0.034
16502	Yes	Cluster	Ots15	15.992	0.019	-0.006	-0.005	0.046
16523	Yes	Cluster	Ots16	31.603	0.044	0.012	-0.005	0.067
16625	Yes	Tala	Ots31	42.452	0.038	-0.003	0.073	0.003
16835	No	Cluster	Ots27	0	0.022	-0.005	-0.006	0.051
17027	Yes	Cluster	Ots03	67.385	0.029	-0.004	0.019	0.043
17420	Yes	Tala	Ots11	66.923	0.025	-0.005	0.065	-0.009
17472	No	Cluster	Ots02	114.172	0.028	0.031	-0.001	0.038
18078	No	Tala	Ots03	102.107	0.030	-0.002	0.062	-0.003
18162	No	Coal	Ots26	41.25	0.044	0.059	0.030	-0.009
18602	Yes	Tala	Ots23	39.24	0.021	0.004	0.068	-0.010
18808	No	Cluster	NA	NA	0.023	-0.009	0.007	0.050
18840	No	Coal	Ots21	59.515	0.034	0.074	-0.006	0.015
18987	No	Cluster	Ots10	96.146	0.033	-0.006	0.001	0.069
19139	Yes	Cluster	NA	NA	0.025	0.005	0.014	0.035
19423	Yes	Coal	Ots19	55.852	0.028	0.059	0.001	-0.006
19425	No	Cluster	Ots05	0	0.029	-0.006	-0.003	0.066
19707	Yes	Cluster	Ots10	59.218	0.023	0.020	-0.003	0.034
19835	No	Cluster	Ots23	24.384	0.015	0.000	-0.006	0.035
19849	No	Cluster	Ots24	1.304	0.031	-0.007	0.012	0.053
20110	Yes	Tala	Ots28	32.026	0.036	0.000	0.064	0.005
20153	No	Cluster	NA	NA	0.030	-0.005	-0.007	0.068
20168	No	Coal	Ots02	29.366	0.040	0.120	0.006	-0.010
20292	Yes	Tala	Ots28	61.449	0.022	-0.006	0.060	-0.006
20343	Yes	Cluster	Ots31	49.542	0.031	0.028	-0.005	0.034
20459	Yes	Coal	Ots33	12.092	0.023	0.059	-0.005	-0.006
20487	Yes	Tala	Ots09	8.825	0.036	0.005	0.083	0.006
20587	Yes	Cluster	Ots27	26.4	0.021	0.007	0.009	0.035
20670	No	Tala	Ots19	27.117	0.037	-0.007	0.090	-0.008
21105	No	Coal	Ots16	58.187	0.060	0.125	0.001	-0.008
21331	No	Cluster	Ots19	29.446	0.028	-0.004	0.006	0.048
21392	Yes	Coal	Ots33	13.985	0.035	0.073	0.000	-0.004
			continued	1				

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Catalog ID         Included in final panel         Purpose         LG         ech         Overall         Coal         Tala         Cluster           21678         Yes         Cluster         Ots0         4.0162         0.018         -0.00         -0.003         0.037           21914         No         Cluster         Ots01         17.73         0.036         -0.00         0.002         -0.005           22283         Yes         Tala         Ots22         34.529         0.001         0.003         0.042           23359         No         Cluster         Ots19         72.439         0.018         -0.004         -0.005         -0.055           23562         No         Cluster         Ots19         7.223         0.021         0.064         0.003         -0.006           23565         Yes         Cluster         Ots01         73.777         0.020         0.007         0.001         0.001           23793         Yes         Cluster         Ots20         7.7483         0.012         0.001         0.002         0.001         0.034           23913         No         Cluster         Ots20         75.7483         0.012         0.003         0.004 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>									
21914	Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
22283         Yes         Tala         Ots22         34.529         0.021         0.000         0.062         -0.005           22426         Yes         Cluster         Ots11         94.591         0.023         -0.001         -0.003         0.042           23359         No         Cluster         Ots31         40         0.044         -0.006         0.034         0.066           23562         No         Cluster         Ots19         72.439         0.018         -0.004         -0.005         0.045           23565         Yes         Coal         Ots19         72.439         0.018         -0.004         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.002         0.001         -0.007         0.000         0.041         23793         Yes         Cluster         Ots20         77.483         0.016         0.001         0.001         0.046         23886         No         Cluster         Ots20         57.066         0.023         0.003         0.014         0.035         24311         No         Cluster         Ots20         57.066         0.023         0.003         0.014         0.035         2457         0.036         0.028         0.005 </td <td>21678</td> <td>Yes</td> <td>Cluster</td> <td>Ots08</td> <td>46.162</td> <td>0.018</td> <td>-0.006</td> <td>-0.003</td> <td>0.039</td>	21678	Yes	Cluster	Ots08	46.162	0.018	-0.006	-0.003	0.039
22426         Yes         Cluster         Ots11         94.591         0.023         0.001         -0.003         0.042           23359         No         Cluster         Ots19         72.439         0.018         -0.004         -0.005         0.045           23562         No         Cluster         Ots19         72.439         0.018         -0.004         -0.005         0.045           23604         Yes         Cluster         Ots01         73.777         0.020         -0.007         0.000         0.041           23793         Yes         Cluster         Ots01         22.203         0.035         -0.002         0.031         0.046           23886         No         Cluster         Ots20         77.483         0.016         0.001         0.000         0.034           23913         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.035           24331         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.032           24458         Yes         Cluster         Ots24         50.295         0.013         -0.005         0.036	21914	No	Cluster	Ots01	17.73	0.036	-0.006	0.001	0.073
23359         No         Cluster         Ots31         40         0.044         -0.006         0.034         0.066           23562         No         Cluster         Ots19         72.439         0.018         -0.004         -0.005         0.045           23604         Yes         Cluster         Ots01         73.777         0.020         -0.007         0.000         0.041           23604         Yes         Cluster         Ots01         73.777         0.020         -0.007         0.000         0.041           23793         Yes         Cluster         Ots02         77.483         0.016         0.001         0.000         0.034           23813         No         Cluster         Ots20         67.7483         0.016         0.001         0.000         0.035           24458         Yes         Cluster         Ots27         41.555         0.025         0.002         0.005         0.035           244572         No         Cluster         Ots24         50.295         0.013         0.005         0.005         0.035           24577         No         Cluster         Ots24         50.295         0.013         0.006         -0.005         0.006	22283	Yes	Tala	Ots22	34.529	0.021	0.000	0.062	-0.005
23562         No         Cluster         Ots19         72.439         0.018         -0.004         -0.005         0.045           23565         Yes         Coal         Ots19         1.223         0.021         0.064         0.003         -0.006           23604         Yes         Cluster         Ots01         73.777         0.020         -0.007         0.000         0.041           23793         Yes         Cluster         Ots01         22.203         0.035         -0.002         0.031         0.046           23886         No         Cluster         Ots20         77.483         0.016         0.001         0.000         0.043           23913         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.035           24458         Yes         Cluster         Ots22         65.773         0.036         0.029         0.005         0.005         0.035           24458         Yes         Cluster         Ots24         50.295         0.013         -0.005         0.005         0.005         0.036           24572         No         Cluster         Ots38         42.555         0.021         0.006         0	22426	Yes	Cluster	Ots11	94.591	0.023	-0.001	-0.003	0.042
23565         Yes         Coal         Ots19         1.223         0.021         0.064         0.003         -0.006           23604         Yes         Cluster         Ots01         73.777         0.020         -0.007         0.000         0.041           23793         Yes         Cluster         Ots20         77.483         0.016         0.001         0.004         0.034           23886         No         Cluster         Ots20         77.483         0.016         0.001         0.004         0.036           23913         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.035           24331         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.035           24458         Yes         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.036           24572         No         Cluster         Ots26         0         0.020         0.060         -0.005         -0.011           24573         No         Coal         Ots26         0         0.020         0.060         -0.005         -0.011	23359	No	Cluster	Ots31	40	0.044	-0.006	0.034	0.066
23604         Yes         Cluster Ots01 (10.00)         73.777         0.020 (10.00)         0.001 (10.00)         0.041 (10.00)           23793         Yes         Cluster Ots01 (10.00)         22.203 (10.03)         0.035 (10.00)         0.031 (10.00)         0.034 (10.00)           23886         No         Cluster Ots20 (10.00)         0.7483 (10.00)         0.003 (10.00)         0.034 (10.00)         0.034 (10.00)           23913         No         Cluster Ots22 (10.00)         0.036 (10.00)         0.003 (10.00)         0.003 (10.00)         0.003 (10.00)         0.005 (10.00)         0.035 (10.00)         0.005 (10.00)         0.005 (10.00)         0.005 (10.00)         0.005 (10.00)         0.003 (10.00)         0.007 (10.00)         0.003 (10.00)         0.007 (10.00)         0.007 (10.00)         0.003 (10.00)         0.004 (10.00) <t< td=""><td>23562</td><td>No</td><td>Cluster</td><td>Ots19</td><td>72.439</td><td>0.018</td><td>-0.004</td><td>-0.005</td><td>0.045</td></t<>	23562	No	Cluster	Ots19	72.439	0.018	-0.004	-0.005	0.045
23793         Yes         Cluster         Ots01         22.203         0.035         -0.002         0.031         0.046           23886         No         Cluster         Ots20         77.483         0.016         0.001         0.000         0.034           23913         No         Cluster         Ots21         65.773         0.036         0.023         0.003         0.014         0.036           24351         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.035           24458         Yes         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.036           24567         No         Cluster         Ots24         50.295         0.013         -0.006         0.018         0.041           24763         No         Cluster         Ots26         0         0.020         0.006         0.011           24763         No         Cluster         Ots26         0         0.020         0.069         -0.005         0.003           24816         No         Tala         Ots26         0         0.021         -0.005         0.000         0.044 <td< td=""><td>23565</td><td>Yes</td><td>Coal</td><td>Ots19</td><td>1.223</td><td>0.021</td><td>0.064</td><td>0.003</td><td>-0.006</td></td<>	23565	Yes	Coal	Ots19	1.223	0.021	0.064	0.003	-0.006
23886         No         Cluster         Ots20         77.483         0.016         0.001         0.000         0.034           23913         No         Cluster         Ots10         57.066         0.023         0.003         0.014         0.036           24331         No         Cluster         Ots27         41.555         0.025         0.007         -0.003         0.037           24458         Yes         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.033           24567         No         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.033           24572         No         Cluster         Ots18         42.053         0.029         -0.006         -0.018         0.041           24763         No         Coal         Ots26         0         0.020         0.069         -0.005         -0.018           24763         No         Cluster         Ots34         44.565         0.021         -0.006         -0.005         -0.001           24763         No         Cluster         Ots34         44.565         0.021         -0.002         0.060         -0.044	23604	Yes	Cluster	Ots01	73.777	0.020	-0.007	0.000	0.041
23913         No         Cluster         Ots 10         57.066         0.023         0.003         0.014         0.036           24331         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.035           24458         Yes         Cluster         Ots27         41.555         0.025         0.007         -0.003         0.037           24567         No         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.036           24572         No         Cluster         Ots38         42.053         0.029         -0.006         -0.011         0.041           24763         No         Coal         Ots26         0         0.020         0.069         -0.005         -0.011           24816         No         Tala         Ots26         0         0.022         -0.005         0.003         2003         2003         0.003         2063         2000         0.004         252         2581         0.021         -0.005         0.000         0.044         25234         Yes         Tala         Ots30         3.108         0.021         -0.005         0.000         0.044         252534	23793	Yes	Cluster	Ots01	22.203	0.035	-0.002	0.031	0.046
24331         No         Cluster         Ots22         65.773         0.036         0.028         0.005         0.035           24458         Yes         Cluster         Ots27         41.555         0.025         0.007         -0.003         0.037           24567         No         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.036           24572         No         Cluster         Ots18         42.053         0.029         -0.006         0.018         0.041           24763         No         Coal         Ots26         0         0.020         0.069         -0.005         -0.011           24816         No         Tala         Ots09         18.89         0.032         -0.003         0.063         0.003           25055         Yes         Cluster         Ots34         44.565         0.021         -0.005         0.000         0.044           25234         Yes         Tala         Ots30         3.108         0.021         -0.005         0.005         2.005           2525273         Yes         Tala         Ots22         58.889         0.032         -0.005         0.083         -0.005	23886	No	Cluster	Ots20	77.483	0.016	0.001	0.000	0.034
24458         Yes         Cluster         Ots27         41.555         0.025         0.007         -0.003         0.037           24567         No         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.036           24572         No         Cluster         Ots18         42.053         0.029         -0.006         0.018         0.041           24763         No         Coal         Ots26         0         0.020         0.069         -0.005         -0.011           24816         No         Tala         Ots09         18.89         0.032         -0.003         0.063         0.003           25055         Yes         Cluster         Ots34         44.565         0.021         -0.005         0.000         0.044           25234         Yes         Tala         Ots30         3.108         0.021         -0.002         0.060         -0.004           25273         Yes         Tala         Ots20         57.928         0.014         -0.006         -0.004           25795         No         Cluster         Ots06         57.928         0.014         -0.006         -0.037         0.056           25876	23913	No	Cluster	Ots10	57.066	0.023	0.003	0.014	0.036
24567         No         Cluster         Ots24         50.295         0.013         -0.006         -0.005         0.036           24572         No         Cluster         Ots18         42.053         0.029         -0.006         0.018         0.041           24763         No         Coal         Ots26         0         0.020         0.069         -0.005         -0.011           24816         No         Tala         Ots09         18.89         0.032         -0.003         0.063         0.003           25055         Yes         Cluster         Ots34         44.565         0.021         -0.005         0.000         0.044           25234         Yes         Tala         Ots22         58.889         0.032         -0.005         0.004         -0.004           25273         Yes         Tala         Ots22         58.889         0.032         -0.005         0.083         -0.005           25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         0.006         0.037         0.056	24331	No	Cluster	Ots22	65.773	0.036	0.028	0.005	0.035
24572         No         Cluster         Ots18         42.053         0.029         -0.006         0.018         0.041           24763         No         Coal         Ots26         0         0.020         0.069         -0.005         -0.011           24816         No         Tala         Ots09         18.89         0.032         -0.003         0.063         0.003           25055         Yes         Cluster         Ots34         44.565         0.021         -0.005         0.000         0.044           25234         Yes         Tala         Ots22         58.889         0.032         -0.005         0.004         -0.005           25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         -0.006         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039 <td< td=""><td>24458</td><td>Yes</td><td>Cluster</td><td>Ots27</td><td>41.555</td><td>0.025</td><td>0.007</td><td>-0.003</td><td>0.037</td></td<>	24458	Yes	Cluster	Ots27	41.555	0.025	0.007	-0.003	0.037
24763         No         Coal         Ots26         0         0.020         0.069         -0.005         -0.011           24816         No         Tala         Ots09         18.89         0.032         -0.003         0.063         0.003           25055         Yes         Cluster         Ots34         44.565         0.021         -0.005         0.000         0.044           25234         Yes         Tala         Ots22         58.889         0.021         -0.002         0.060         -0.004           25273         Yes         Tala         Ots22         58.889         0.032         -0.005         0.083         -0.005           25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         41.307         0.031         0.085         0.007         -0.005           26263	24567	No	Cluster	Ots24	50.295	0.013	-0.006	-0.005	0.036
24816         No         Tala         Ots09         18.89         0.032         -0.003         0.063         0.004           25055         Yes         Cluster         Ots34         44.565         0.021         -0.005         0.000         0.044           25234         Yes         Tala         Ots30         3.108         0.021         -0.002         0.060         -0.004           25273         Yes         Tala         Ots22         58.889         0.032         -0.005         0.083         -0.005           25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         -0.006         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         41.307         0.031         0.085         0.007         -0.005           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005	24572	No	Cluster	Ots18	42.053	0.029	-0.006	0.018	0.041
25055         Yes         Cluster         Ots34         44.565         0.021         -0.005         0.000         0.044           25234         Yes         Tala         Ots30         3.108         0.021         -0.002         0.060         -0.004           25273         Yes         Tala         Ots22         58.889         0.032         -0.005         0.083         -0.005           25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         -0.006         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009	24763	No	Coal	Ots26	0	0.020	0.069	-0.005	-0.011
25234         Yes         Tala         Ots30         3.108         0.021         -0.002         0.060         -0.004           25273         Yes         Tala         Ots22         58.889         0.032         -0.005         0.083         -0.005           25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         -0.006         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.07           2	24816	No	Tala	Ots09	18.89	0.032	-0.003	0.063	0.003
25273         Yes         Tala         Ots22         58.889         0.032         -0.005         0.083         -0.005           25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         -0.006         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.06         0.044 <td< td=""><td>25055</td><td>Yes</td><td>Cluster</td><td>Ots34</td><td>44.565</td><td>0.021</td><td>-0.005</td><td>0.000</td><td>0.044</td></td<>	25055	Yes	Cluster	Ots34	44.565	0.021	-0.005	0.000	0.044
25625         No         Cluster         Ots06         57.928         0.014         -0.006         -0.004         0.037           25795         No         Coal         NA         NA         0.028         0.073         -0.006         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004	25234	Yes	Tala	Ots30	3.108	0.021	-0.002	0.060	-0.004
25795         No         Coal         NA         NA         0.028         0.073         -0.006         -0.006           25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           2	25273	Yes	Tala	Ots22	58.889	0.032	-0.005	0.083	-0.005
25876         Yes         Cluster         Ots22         25.828         0.046         -0.006         0.037         0.056           26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26557         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009	25625	No	Cluster	Ots06	57.928	0.014	-0.006	-0.004	0.037
26045         No         Cluster         Ots30         63.011         0.043         0.017         0.016         0.039           26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043	25795	No	Coal	NA	NA	0.028	0.073	-0.006	-0.006
26189         Yes         Coal         Ots30         41.307         0.031         0.085         0.007         -0.005           26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28	25876	Yes	Cluster	Ots22	25.828	0.046	-0.006	0.037	0.056
26263         No         Tala         Ots29         55.397         0.045         0.006         0.119         -0.009           26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.039           285	26045	No	Cluster	Ots30	63.011	0.043	0.017	0.016	0.039
26346         No         Coal         Ots06         54.56         0.032         0.077         0.034         -0.007           26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039 <td< td=""><td>26189</td><td>Yes</td><td>Coal</td><td>Ots30</td><td>41.307</td><td>0.031</td><td>0.085</td><td>0.007</td><td>-0.005</td></td<>	26189	Yes	Coal	Ots30	41.307	0.031	0.085	0.007	-0.005
26449         No         Cluster         Ots05         51.858         0.022         0.000         -0.006         0.044           26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.028         -0.007         0.066         0.006           29090	26263	No	Tala	Ots29	55.397	0.045	0.006	0.119	-0.009
26506         No         Coal         Ots34         36.195         0.026         0.061         0.026         -0.004           26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090<	26346	No	Coal	Ots06	54.56	0.032	0.077	0.034	-0.007
26644         Yes         Cluster         Ots12         10.201         0.027         0.015         0.009         0.038           26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	26449	No	Cluster	Ots05	51.858	0.022	0.000	-0.006	0.044
26657         Yes         Tala         Ots29         55.397         0.024         -0.005         0.068         -0.009           26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	26506	No	Coal	Ots34	36.195	0.026	0.061	0.026	-0.004
26757         Yes         Cluster         NA         NA         0.021         0.001         -0.003         0.043           27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	26644	Yes	Cluster	Ots12	10.201	0.027	0.015	0.009	0.038
27324         Yes         Coal         Ots15         46.736         0.029         0.061         0.029         0.001           28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	26657	Yes	Tala	Ots29	55.397	0.024	-0.005	0.068	-0.009
28058         No         Coal         Ots10         63.539         0.030         0.071         -0.002         0.008           28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	26757	Yes	Cluster	NA	NA	0.021	0.001	-0.003	0.043
28238         Yes         Cluster         Ots28         63.368         0.017         0.001         -0.005         0.039           28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	27324	Yes	Coal	Ots15	46.736	0.029	0.061	0.029	0.001
28526         No         Tala         NA         NA         0.030         -0.006         0.077         -0.009           28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	28058	No	Coal	Ots10	63.539	0.030	0.071	-0.002	0.008
28544         Yes         Tala         Ots04         10.214         0.028         -0.007         0.066         0.006           29090         No         Cluster         Ots09         98.732         0.039         0.037         0.027         0.038	28238	Yes	Cluster	Ots28	63.368	0.017	0.001	-0.005	0.039
29090 No Cluster Ots09 98.732 0.039 0.037 0.027 0.038	28526	No	Tala	NA	NA	0.030	-0.006	0.077	-0.009
29090 No Cluster Ots09 98.732 0.039 0.037 0.027 0.038	28544	Yes	Tala	Ots04	10.214	0.028	-0.007	0.066	0.006
	29090	No						0.027	
	29121	Yes	Cluster	Ots12	10.736	0.027	0.003	-0.006	0.055

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Catalog ID         Included in final pame         Purpose         LG         CM         Overall         Coal         Cluster           29150         No         Coal         Ota28         62,268         0.021         0.058         -0.006         -0.004           29769         Yes         Tala         Ots08         104.05         0.031         -0.002         0.095         -0.011           30047         Yes         Cluster         Ots07         59.18         0.021         -0.00         0.011         0.032           30060         No         Cluster         Ots26         6.346         0.022         -0.06         0.001         0.034           30208         No         Cluster         Ots26         6.346         0.022         -0.06         0.003         0.044           30345         Yes         Cluster         Ots03         85.479         0.042         0.067         0.008         0.005           30562         Yes         Cluster         Ots03         38.19         0.022         0.005         0.007         38.19         0.022         0.005         0.007         30759         Yes         Cluster         Ots09         6.456         0.030         0.006         0.0073 </th <th>-</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	-								
29769         Yes         Tala         Ots08         104.05         0.031         -0.002         0.095         -0.011           30047         Yes         Cluster         Ots07         59.18         0.021         -0.006         0.011         0.036           30060         No         Colal         Ots29         2.05         0.016         -0.006         0.001         -0.003           30120         No         Cluster         Ots29         2.05         0.016         -0.006         0.001         -0.003           30208         No         Cluster         Ots25         66.944         0.042         0.067         0.008         0.005           30562         Yes         Cluster         Ots25         66.944         0.044         0.027         -0.006         0.073           30878         No         Cluster         Ots07         38.19         0.025         -0.005         -0.006         0.077           31534         No         Cluster         Ots03         33.553         0.026         0.030         -0.066         -0.008         0.007           31577         Yes         Cluster         Ots03         33.553         0.026         0.030         0.066         0.0	Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
30047   Yes	29150	No	Coal	Ots28	62.268	0.021	0.058	-0.006	-0.004
30060         No         Coal         Ots07         18.07         0.032         0.064         0.001         -0.002           30120         No         Cluster         Ots29         2.05         0.016         -0.006         0.001         0.035           30208         No         Cluster         Ots26         6.346         0.022         -0.006         0.003         0.044           30345         Yes         Coal         Ots03         85.479         0.042         0.067         0.008         0.005           30562         Yes         Cluster         Ots07         38.19         0.025         -0.005         -0.004         0.057           30878         No         Cluster         Ots08         54.934         0.024         -0.05         0.017         0.037           31577         Yes         Cluster         Ots03         33.553         0.026         0.030         -0.066         -0.008         0.07           31579         No         Cluster         Ots03         33.553         0.026         0.030         -0.06         -0.002         0.033           31599         No         Cluster         Ots03         61.772         0.034         -0.00         0.068 <td>29769</td> <td>Yes</td> <td>Tala</td> <td>Ots08</td> <td>104.05</td> <td>0.031</td> <td>-0.002</td> <td>0.095</td> <td>-0.011</td>	29769	Yes	Tala	Ots08	104.05	0.031	-0.002	0.095	-0.011
30120	30047	Yes	Cluster	Ots07	59.18	0.021	-0.006	0.011	0.036
30208	30060	No	Coal	Ots07	18.07	0.032	0.064	0.001	-0.002
30345         Yes         Coal         Ots03         85.479         0.042         0.067         0.008         0.005           30562         Yes         Cluster         Ots25         66.944         0.044         0.027         -0.006         0.073           30759         Yes         Cluster         Ots08         54.934         0.024         -0.005         -0.004         0.057           30878         No         Cluster         Ots08         54.934         0.024         -0.005         0.017         0.037           31577         Yes         Cluster         Ots03         33.553         0.026         0.030         -0.002         0.035           31579         No         Cluster         Ots08         16.243         0.014         -0.006         0.001         0.034           31796         Yes         Tala         Ots09         61.772         0.034         -0.006         0.068         0.013           31798         No         Tala         NA         NA         0.026         0.003         0.076         -0.009           32274         Yes         Cluster         Ots10         1.833         0.047         0.010         0.005         0.085	30120	No	Cluster	Ots29	2.05	0.016	-0.006	0.001	0.035
30562   Yes   Cluster   Ots25   66.944   0.044   0.027   0.006   0.073   30759   Yes   Cluster   Ots07   38.19   0.025   0.005   0.004   0.057   30878   No   Cluster   Ots08   54.934   0.024   0.005   0.017   0.037   31534   No   Coal   Ots29   6.456   0.030   0.066   0.008   0.007   31577   Yes   Cluster   Ots03   33.553   0.026   0.030   0.002   0.035   31599   No   Cluster   Ots08   16.243   0.014   0.006   0.001   0.034   31796   Yes   Tala   Ots09   61.772   0.034   0.006   0.068   0.013   31798   No   Tala   NA   NA   0.026   0.003   0.005   0.038   32074   Yes   Cluster   Ots02   0   0.023   0.008   0.005   0.038   32126   No   Cluster   Ots10   1.833   0.047   0.010   0.005   0.050   32279   Yes   Cluster   Ots10   1.833   0.047   0.010   0.005   0.085   32287   Yes   Tala   Ots04   8.571   0.036   0.027   0.090   0.009   32804   No   Cluster   Ots19   27.117   0.017   0.009   0.003   0.037   32867   No   Cluster   Ots29   2.449   0.025   0.004   0.006   0.054   0.054   33474   No   Cluster   Ots29   2.449   0.025   0.004   0.006   0.054   0.054   33474   No   Cluster   Ots29   2.449   0.025   0.004   0.006   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.055   0.054   0.054   0.055   0.054   0.054   0.055	30208	No	Cluster	Ots26	6.346	0.022	-0.006	0.003	0.044
30759         Yes         Cluster         Ots07         38.19         0.025         -0.005         -0.004         0.057           30878         No         Cluster         Ots08         54.934         0.024         -0.005         0.017         0.037           31534         No         Coal         Ots29         6.456         0.030         0.066         -0.008         0.007           31577         Yes         Cluster         Ots03         33.553         0.026         0.030         -0.002         0.035           31599         No         Cluster         Ots08         16.243         0.014         -0.006         0.001         0.033           31796         Yes         Tala         Ots09         61.772         0.034         -0.006         0.068         0.013           31798         No         Tala         NA         NA         0.026         0.003         0.076         -0.009           32274         Yes         Cluster         Ots02         0         0.023         0.006         -0.005         0.038           32279         Yes         Cluster         Ots10         1.833         0.047         0.010         0.005         0.085 <td< td=""><td>30345</td><td>Yes</td><td>Coal</td><td>Ots03</td><td>85.479</td><td>0.042</td><td>0.067</td><td>0.008</td><td>0.005</td></td<>	30345	Yes	Coal	Ots03	85.479	0.042	0.067	0.008	0.005
30878         No         Cluster         Ots08         54,934         0.024         -0.005         0.017         0.037           31534         No         Coal         Ots29         6.456         0.030         0.066         -0.008         0.007           31577         Yes         Cluster         Ots03         33.553         0.026         0.030         -0.002         0.035           31599         No         Cluster         Ots08         16.243         0.014         -0.006         0.001         0.034           31796         Yes         Tala         Ots09         61.772         0.034         -0.006         0.068         0.013           31798         No         Tala         NA         NA         0.026         0.003         0.076         -0.009           32074         Yes         Cluster         Ots02         0         0.023         0.008         0.005         0.038           32126         No         Cluster         Ots19         4.532         0.023         0.006         -0.005         0.055           32287         Yes         Tala         Ots11         40.153         0.073         0.072         0.154         -0.010           328	30562	Yes	Cluster	Ots25	66.944	0.044	0.027	-0.006	0.073
31534	30759	Yes	Cluster	Ots07	38.19	0.025	-0.005	-0.004	0.057
31577   Yes	30878	No	Cluster	Ots08	54.934	0.024	-0.005	0.017	0.037
31599	31534	No	Coal	Ots29	6.456	0.030	0.066	-0.008	0.007
31796         Yes         Tala         Ots09         61.772         0.034         -0.006         0.068         0.013           31798         No         Tala         NA         NA         0.026         0.003         0.076         -0.009           32074         Yes         Cluster         Ots02         0         0.023         0.008         0.005         0.038           32126         No         Cluster         Ots15         4.532         0.023         -0.006         -0.005         0.050           32279         Yes         Cluster         Ots10         1.833         0.047         0.010         0.005         0.085           32287         Yes         Tala         Ots11         40.153         0.073         0.072         0.154         -0.010           32804         No         Cluster         Ots04         8.571         0.036         0.027         0.090         -0.003           32867         No         Cluster         Ots19         27.117         0.017         -0.009         -0.003         0.037           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054	31577	Yes	Cluster	Ots03	33.553	0.026	0.030	-0.002	0.035
31798         No         Tala         NA         NA         0.026         0.003         0.076         -0.009           32074         Yes         Cluster         Ots02         0         0.023         0.008         0.005         0.038           32126         No         Cluster         Ots15         4.532         0.023         -0.006         -0.005         0.050           32279         Yes         Cluster         Ots10         1.833         0.047         0.010         0.005         0.085           32287         Yes         Tala         Ots11         40.153         0.073         0.072         0.154         -0.010           32787         No         Tala         Ots04         8.571         0.036         0.027         0.090         -0.009           32804         No         Cluster         Ots19         27.117         0.017         -0.009         -0.003         0.037           32867         No         Cluster         Ots19         27.117         0.017         -0.009         -0.003         0.058           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054	31599	No	Cluster	Ots08	16.243	0.014	-0.006	0.001	0.034
32074         Yes         Cluster Ots02         0         0.023         0.008         0.005         0.038           32126         No         Cluster Ots15         4.532         0.023         -0.006         -0.005         0.050           32279         Yes         Cluster Ots10         1.833         0.047         0.010         0.005         0.085           32287         Yes         Tala         Ots11         40.153         0.073         0.072         0.154         -0.010           32787         No         Tala         Ots04         8.571         0.036         0.027         0.090         -0.009           32804         No         Cluster         OKs19         27.117         0.017         -0.009         -0.003         0.037           32867         No         Cluster         Ots29         2.7117         0.017         -0.009         -0.003         0.037           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         Ots14         73.721         0.045         0.021         0.049           33876         Yes         Tala <td< td=""><td>31796</td><td>Yes</td><td>Tala</td><td>Ots09</td><td>61.772</td><td>0.034</td><td>-0.006</td><td>0.068</td><td>0.013</td></td<>	31796	Yes	Tala	Ots09	61.772	0.034	-0.006	0.068	0.013
32126         No         Cluster         Ots 15         4.532         0.023         -0.006         -0.005         0.050           32279         Yes         Cluster         Ots 10         1.833         0.047         0.010         0.005         0.085           32287         Yes         Tala         Ots 11         40.153         0.073         0.072         0.154         -0.010           32787         No         Tala         Ots 04         8.571         0.036         0.027         0.090         -0.009           32804         No         Cluster         Ots 19         27.117         0.017         -0.009         -0.003         0.037           32867         No         Cluster         Ots 19         27.117         0.017         -0.009         -0.003         0.037           32984         No         Tala         Ots 25         64.347         0.037         -0.003         0.058         0.015           33013         Yes         Cluster         Ots 29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         Ots 14         73.721         0.045         0.021         0.049           338	31798	No	Tala	NA	NA	0.026	0.003	0.076	-0.009
32279         Yes         Cluster         Ots10         1.833         0.047         0.010         0.005         0.085           32287         Yes         Tala         Ots11         40.153         0.073         0.072         0.154         -0.010           32787         No         Tala         Ots04         8.571         0.036         0.027         0.090         -0.009           32804         No         Cluster         NA         NA         0.030         -0.003         0.041         0.036           32867         No         Cluster         Ots19         27.117         0.017         -0.009         -0.003         0.037           32984         No         Tala         Ots25         64.347         0.037         -0.003         0.058         0.015           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         Ots14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003	32074	Yes	Cluster	Ots02	0	0.023	0.008	0.005	0.038
32287         Yes         Tala Ots11 Ots04         40.153 0.073 0.072 0.154 0.090 0.009           32787         No         Tala Ots04 8.571 0.036 0.027 0.090 0.009           32804         No         Cluster NA NA 0.030 0.003 0.041 0.036           32867         No         Cluster Ots19 27.117 0.017 0.009 0.003 0.037           32984         No         Tala Ots25 64.347 0.037 0.003 0.058 0.015           33013         Yes         Cluster Ots29 2.449 0.025 0.004 0.006 0.054           33474         No         Cluster NA NA 0.021 0.013 0.005 0.037           33502         No         Cluster Ots14 73.721 0.045 0.045 0.021 0.049           33876         Yes         Tala Ots21 14.627 0.034 0.018 0.074 0.003           34102         No         Cluster Ots26 27.273 0.019 0.001 0.001 0.001 0.039           34281         No         Cluster Ots33 61.935 0.028 0.002 0.011 0.037           34486         No         Cluster Ots06 19.163 0.029 0.014 0.006 0.052           34631         No         Cluster Ots26 27.273 0.019 0.01 0.001 0.000 0.035           34797         No         Cluster Ots28 63.398 0.018 0.002 0.01 0.000 0.035           34802         Yes         Cluster Ots24 52.111 0.028 0.012 0.002 0.002 0.035           35479         No         Cluster Ots24 52.973 0.020 0.064 0.002 0.002 0.008           35625<	32126	No	Cluster	Ots15	4.532	0.023	-0.006	-0.005	0.050
32787         No         Tala         Ots04         8.571         0.036         0.027         0.090         -0.009           32804         No         Cluster         NA         NA         0.030         -0.003         0.041         0.036           32867         No         Cluster         Ots19         27.117         0.017         -0.009         -0.003         0.037           32984         No         Tala         Ots25         64.347         0.037         -0.003         0.058         0.015           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         NA         NA         0.021         0.013         -0.005         0.037           33502         No         Cluster         Ots14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.033           3428	32279	Yes	Cluster	Ots10	1.833	0.047	0.010	0.005	0.085
32804         No         Cluster         NA         NA         0.030         -0.003         0.041         0.036           32867         No         Cluster         Ots19         27.117         0.017         -0.009         -0.003         0.037           32984         No         Tala         Ots25         64.347         0.037         -0.003         0.058         0.015           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         NA         NA         0.021         0.013         -0.005         0.037           33502         No         Cluster         Ots14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots33         61.935         0.028         0.002         0.011         0.037           3	32287	Yes	Tala	Ots11	40.153	0.073	0.072	0.154	-0.010
32867         No         Cluster         Ots19         27.117         0.017         -0.009         -0.003         0.037           32984         No         Tala         Ots25         64.347         0.037         -0.003         0.058         0.015           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         NA         NA         0.021         0.013         -0.005         0.037           33502         No         Cluster         Ots14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots07         59.18         0.015         -0.001         0.000         0.035	32787	No	Tala	Ots04	8.571	0.036	0.027	0.090	-0.009
32984         No         Tala         Ots25         64.347         0.037         -0.003         0.058         0.015           33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         NA         NA         0.021         0.013         -0.005         0.037           33502         No         Cluster         Ots14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots33         61.935         0.028         0.002         0.011         0.037           34486         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.035	32804	No	Cluster	NA	NA	0.030	-0.003	0.041	0.036
33013         Yes         Cluster         Ots29         2.449         0.025         0.004         -0.006         0.054           33474         No         Cluster         NA         NA         0.021         0.013         -0.005         0.037           33502         No         Cluster         Ots14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots33         61.935         0.028         0.002         0.011         0.037           34486         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots07         59.18         0.015         -0.001         0.000         0.035           34802         Yes         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.003	32867	No	Cluster	Ots19	27.117	0.017	-0.009	-0.003	0.037
33474         No         Cluster         NA         NA         0.021         0.013         -0.005         0.037           33502         No         Cluster         Ots14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots33         61.935         0.028         0.002         0.011         0.037           34486         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots27         59.18         0.015         -0.001         0.000         0.035           34797         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.034           35239         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.051	32984	No	Tala	Ots25	64.347	0.037	-0.003	0.058	0.015
33502         No         Cluster         Ots 14         73.721         0.045         0.045         0.021         0.049           33876         Yes         Tala         Ots 21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots 26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots 33         61.935         0.028         0.002         0.011         0.037           34486         No         Cluster         Ots 06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots 07         59.18         0.015         -0.001         0.000         0.035           34797         No         Cluster         Ots 28         63.398         0.018         0.003         -0.002         0.035           34802         Yes         Cluster         Ots 27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots 24         52.111         0.028         0.012         -0.003         0.051	33013	Yes	Cluster	Ots29	2.449	0.025	0.004	-0.006	0.054
33876         Yes         Tala         Ots21         14.627         0.034         0.018         0.074         0.003           34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots33         61.935         0.028         0.002         0.011         0.037           34486         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots07         59.18         0.015         -0.001         0.000         0.035           34797         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.035           34802         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008	33474	No	Cluster	NA	NA	0.021	0.013	-0.005	0.037
34102         No         Cluster         Ots26         27.273         0.019         -0.001         0.001         0.039           34281         No         Cluster         Ots33         61.935         0.028         0.002         0.011         0.037           34486         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots07         59.18         0.015         -0.001         0.000         0.035           34797         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.035           34802         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049 <tr< td=""><td>33502</td><td>No</td><td>Cluster</td><td>Ots14</td><td>73.721</td><td>0.045</td><td>0.045</td><td>0.021</td><td>0.049</td></tr<>	33502	No	Cluster	Ots14	73.721	0.045	0.045	0.021	0.049
34281         No         Cluster         Ots33         61.935         0.028         0.002         0.011         0.037           34486         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots07         59.18         0.015         -0.001         0.000         0.035           34797         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.035           34802         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.041 <tr< td=""><td>33876</td><td>Yes</td><td>Tala</td><td>Ots21</td><td>14.627</td><td>0.034</td><td>0.018</td><td>0.074</td><td>0.003</td></tr<>	33876	Yes	Tala	Ots21	14.627	0.034	0.018	0.074	0.003
34486         No         Cluster         Ots06         19.163         0.029         0.014         -0.006         0.052           34631         No         Cluster         Ots07         59.18         0.015         -0.001         0.000         0.035           34797         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.035           34802         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots22         42.556         0.020         -0.002         0.002         0.040           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.041           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041 <td>34102</td> <td>No</td> <td>Cluster</td> <td>Ots26</td> <td>27.273</td> <td>0.019</td> <td>-0.001</td> <td>0.001</td> <td>0.039</td>	34102	No	Cluster	Ots26	27.273	0.019	-0.001	0.001	0.039
34631         No         Cluster         Ots07         59.18         0.015         -0.001         0.000         0.035           34797         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.035           34802         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots22         42.556         0.020         -0.002         0.002         0.040           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041	34281	No	Cluster	Ots33	61.935	0.028	0.002	0.011	0.037
34797         No         Cluster         Ots28         63.398         0.018         0.003         -0.002         0.035           34802         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots22         42.556         0.020         -0.002         0.002         0.040           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041	34486	No	Cluster	Ots06	19.163	0.029	0.014	-0.006	0.052
34802         Yes         Cluster         Ots27         54.3         0.030         0.029         0.009         0.034           35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots22         42.556         0.020         -0.002         0.002         0.040           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041	34631	No	Cluster	Ots07	59.18	0.015	-0.001	0.000	0.035
35239         Yes         Cluster         Ots24         52.111         0.028         0.012         -0.003         0.051           35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots22         42.556         0.020         -0.002         0.002         0.040           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041	34797	No	Cluster	Ots28	63.398	0.018	0.003	-0.002	0.035
35479         No         Coal         Ots20         52.973         0.020         0.064         -0.002         -0.008           35625         No         Cluster         Ots22         42.556         0.020         -0.002         0.002         0.040           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041	34802	Yes	Cluster	Ots27	54.3	0.030	0.029	0.009	0.034
35625         No         Cluster         Ots22         42.556         0.020         -0.002         0.002         0.040           35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041	35239	Yes	Cluster	Ots24	52.111	0.028	0.012	-0.003	0.051
35949         Yes         Cluster         Ots18         57.342         0.038         0.011         0.011         0.049           35997         No         Cluster         Ots02         46.284         0.038         0.026         -0.001         0.041	35479	No	Coal	Ots20	52.973	0.020	0.064	-0.002	-0.008
35997 No Cluster Ots02 46.284 0.038 0.026 -0.001 0.041	35625	No	Cluster	Ots22	42.556	0.020	-0.002	0.002	0.040
35997 No Cluster Ots02 46.284 0.038 0.026 -0.001 0.041	35949	Yes	Cluster	Ots18	57.342	0.038	0.011	0.011	0.049
	35997	No							
	36007	No	Cluster	Ots26	34.513	0.018	-0.007	-0.006	0.048

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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
36202	Yes	Cluster	Ots25	17.979	0.020	-0.006	-0.004	0.045
36203	No	Cluster	Ots13	100.914	0.019	-0.006	0.007	0.036
36740	No	Cluster	Ots03	112.652	0.013	0.003	-0.007	0.036
36801	No	Cluster	Ots01	116.607	0.022	0.002	0.009	0.037
36833	No	Cluster	Ots30	14.268	0.023	-0.002	0.016	0.037
36916	Yes	Cluster	Ots10	21.59	0.043	0.006	0.013	0.073
36932	No	Cluster	Ots28	24.845	0.049	0.003	0.036	0.057
37035	Yes	Tala	Ots12	97.033	0.034	0.010	0.087	-0.004
37275	Yes	Cluster	Ots07	59.46	0.032	-0.002	0.006	0.059
37661	Yes	Cluster	Ots10	54.769	0.018	-0.006	-0.001	0.037
37714	No	Cluster	Ots12	0.001	0.083	-0.007	0.030	0.118
37744	Yes	Tala	Ots02	59.883	0.021	-0.004	0.065	-0.008
38074	No	Cluster	Ots29	55.397	0.017	-0.004	-0.005	0.037
38104	Yes	Tala	Ots05	83.466	0.042	0.016	0.104	-0.006
38331	Yes	Cluster	Ots28	47.571	0.027	-0.006	-0.005	0.061
38337	Yes	Cluster	Ots09	71.92	0.016	0.001	-0.006	0.035
38515	No	Cluster	Ots02	55.469	0.020	0.006	-0.005	0.039
38531	No	Tala	Ots15	98.243	0.038	-0.003	0.063	0.023
38689	No	Cluster	Ots06	21.477	0.021	-0.005	0.007	0.036
38946	No	Tala	Ots13	33.841	0.045	0.001	0.103	0.008
39314	No	Cluster	Ots05	59.157	0.014	-0.005	-0.004	0.037
39584	No	Cluster	Ots06	103.168	0.014	-0.005	-0.007	0.038
39725	No	Tala	Ots03	43.62	0.036	0.008	0.082	0.006
40026	No	Cluster	Ots31	48.19	0.034	0.020	0.015	0.047
40086	Yes	Tala	Ots20	77.483	0.049	0.010	0.083	0.004
40163	Yes	Cluster	Ots09	50.704	0.025	0.005	-0.008	0.051
40389	No	Cluster	Ots34	35.937	0.030	-0.005	-0.005	0.060
40477	Yes	Cluster	Ots19	29.446	0.027	-0.003	0.005	0.049
40562	No	Tala	NA	NA	0.021	-0.007	0.059	-0.005
40588	Yes	Cluster	Ots01	79.29	0.030	-0.006	-0.003	0.062
40978	No	Tala	Ots04	2.827	0.034	-0.001	0.064	0.009
41051	No	Cluster	Ots03	107.494	0.025	-0.004	0.012	0.035
41272	No	Cluster	Ots20	64.761	0.018	0.000	-0.003	0.034
41732	No	Coal	Ots26	62.001	0.039	0.102	0.017	-0.006
42036	No	Cluster	Ots08	105.198	0.026	0.015	-0.006	0.043
42060	No	Cluster	Ots02	86.529	0.028	0.002	0.017	0.038
42112	No	Cluster	Ots16	78.437	0.015	-0.006	-0.003	0.036
42562	Yes	Cluster	Ots20	78.088	0.017	-0.003	-0.005	0.042
42766	No	Cluster	NA	NA	0.025	0.002	-0.004	0.050
			continued					

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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
42851	Yes	Cluster	Ots01	2.664	0.034	-0.004	-0.003	0.076
42863	No	Cluster	Ots06	39.069	0.027	0.001	0.004	0.040
42864	Yes	Coal	Ots05	12.539	0.020	0.060	-0.003	-0.003
43082	Yes	Tala	Ots32	54.648	0.047	0.008	0.113	0.001
43086	Yes	Cluster	NA	NA	0.015	-0.006	-0.006	0.038
43187	No	Cluster	Ots03	103.607	0.014	-0.006	-0.004	0.036
43322	No	Tala	Ots09	21.39	0.061	-0.007	0.124	0.009
43828	No	Cluster	Ots13	55.501	0.027	0.010	-0.005	0.054
44834	Yes	Coal	Ots33	23.254	0.040	0.098	-0.006	-0.003
44889	Yes	Coal	Ots02	112.405	0.027	0.075	0.009	0.001
45063	Yes	Cluster	Ots13	82.075	0.030	-0.006	0.020	0.040
45344	No	Cluster	Ots02	110.927	0.015	-0.002	-0.005	0.037
45623	No	Cluster	Ots06	54.56	0.026	-0.004		0.044
46175	No	Tala	Ots19	7.444	0.029	-0.007	0.073	0.000
46327	No	Cluster	Ots18	55.966	0.022	0.005	-0.007	0.035
46345	No	Tala	Ots09	17.413	0.046	0.024	0.082	0.022
46755	No	Cluster	Ots12	56.195	0.013	-0.007	-0.006	0.037
46842	Yes	Cluster	Ots31	49.248	0.023	0.000	-0.003	0.042
46901	No	Coal	Ots11	53.786	0.044	0.105	0.006	0.009
46922	No	Tala	Ots21	59.781	0.041	0.006	0.073	-0.009
47191	Yes	Coal	Ots17	45.911	0.077	0.117	0.020	0.010
47412	No	Cluster	Ots12	10.743	0.015	0.004	-0.006	0.034
47758	No	Cluster	Ots06	21.021	0.026	0.000	0.003	0.046
48032	Yes	Cluster	Ots10	96.146	0.024	-0.003	-0.001	0.052
48148	No	Cluster	NA	NA	0.020	0.003	-0.007	0.051
48167	No	Cluster	Ots09	42.244	0.018	-0.005	-0.005	0.041
48209	No	Cluster	Ots08	53.325	0.027	0.002	0.002	0.037
48478	No	Cluster	Ots02	4.341	0.024	0.004	-0.004	0.044
48610	No	Cluster	Ots16	107.897	0.011	-0.008	-0.007	0.034
48649	Yes	Coal	Ots16	3.019	0.037	0.075	0.036	0.001
48852	No	Cluster	NA	NA	0.018	0.005	-0.001	0.038
48855	Yes	Coal	Ots12	38.635	0.026	0.062	-0.003	-0.004
49015	No	Cluster	Ots08	49.84	0.014	-0.006	-0.006	0.039
49326	No	Coal	Ots31	43.095	0.020	0.058	-0.007	-0.005
49553	No	Cluster	Ots09	64.678	0.019	-0.004	0.008	0.037
49621	No	Cluster	Ots30	59.329	0.033	0.012	0.014	0.049
50114	No	Cluster	Ots15	95.28	0.022	0.016	-0.004	0.036
50399	No	Tala	NA	NA	0.042	0.017	0.062	-0.005
50458	Yes	Cluster	Ots06	98.791	0.030	0.016	-0.001	0.046

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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
50525	No	Tala	Ots30	55.88	0.063	0.072	0.077	0.028
50811	No	Cluster	Ots19	74.542	0.019	0.005	-0.006	0.038
50837	No	Coal	Ots10	3.487	0.024	0.066	-0.006	-0.005
51032	Yes	Tala	Ots14	48.907	0.068	0.069	0.122	0.005
51278	No	Cluster	Ots05	106.123	0.026	0.008	0.003	0.047
51364	No	Cluster	Ots06	101.99	0.031	0.010	0.007	0.042
51701	No	Tala	Ots26	35.941	0.035	0.009	0.058	-0.004
51844	No	Cluster	NA	NA	0.018	-0.007	-0.005	0.043
52242	Yes	Coal	NA	NA	0.030	0.078	-0.004	0.003
52493	No	Cluster	Ots10	74.451	0.015	-0.005	-0.005	0.039
52671	No	Cluster	NA	NA	0.019	-0.007	-0.006	0.048
53049	No	Tala	Ots06	77.957	0.020	-0.003	0.061	-0.008
53050	Yes	Tala	Ots12	2.25	0.047	0.004	0.123	-0.009
53102	No	Cluster	Ots12	19.08	0.013	-0.006	-0.007	0.036
53513	Yes	Cluster	Ots15	4.532	0.031	-0.001	-0.005	0.068
53612	No	Cluster	Ots01	79.284	0.014	-0.002	-0.004	0.039
54163	No	Cluster	Ots33	31.272	0.032	-0.004	0.032	0.042
54208	No	Coal	Ots06	72.068	0.020	0.067	-0.004	-0.009
54236	No	Cluster	NA	NA	0.053	-0.006	0.000	0.108
54388	No	Cluster	Ots17	2.505	0.033	-0.006	0.023	0.042
54614	Yes	Coal	Ots11	99.152	0.025	0.061	-0.001	0.007
54653	Yes	Cluster	Ots07	33.166	0.044	-0.006	0.014	0.073
54765	No	Cluster	Ots04	32.055	0.032	-0.005	0.041	0.037
55425	Yes	Cluster	Ots04	54.241	0.028	0.003	-0.004	0.047
55538	Yes	Coal	NA	NA	0.025	0.064	-0.005	-0.006
55571	Yes	Tala	Ots11	46.438	0.035	-0.006	0.077	0.010
55829	No	Cluster	Ots33	76.596	0.017	-0.001	-0.001	0.037
56369	No	Cluster	Ots03	27.308	0.024	-0.006	0.002	0.043
56440	No	Cluster	Ots19	21.024	0.030	0.036	-0.002	0.035
56668	No	Tala	Ots03	55.092	0.031	0.002	0.084	-0.006
56955	No	Coal	Ots01	35.283	0.026	0.060	0.028	-0.004
57006	Yes	Coal	Ots05	101.891	0.059	0.138	-0.004	-0.008
57041	No	Cluster	Ots18	41.355	0.039	0.011	0.004	0.048
57266	No	Cluster	Ots03	41.924	0.014	-0.005	-0.006	0.038
57475	No	Cluster	Ots08	14.477	0.014	-0.005	-0.006	0.035
57521	No	Cluster	Ots21	60.579	0.035	-0.002	0.006	0.056
57654	Yes	Coal	Ots28	63.398	0.057	0.093	0.050	0.022
57669	Yes	Cluster	Ots19	29.446	0.035	0.001	0.007	0.059
57815	No	Cluster	Ots09	112.557	0.024	0.016	0.000	0.035

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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
57941	No	Tala	Ots11	29.878	0.030	-0.004	0.066	-0.004
58089	No	Coal	Ots06	2.919	0.030	0.066	-0.005	0.005
58404	No	Coal	Ots33	2.201	0.030	0.065	-0.006	0.008
59380	No	Coal	Ots06	22.137	0.023	0.060	0.005	-0.002
59572	Yes	Coal	Ots30	21.618	0.034	0.078	-0.005	0.010
59601	No	Cluster	Ots01	73.777	0.010	-0.001	-0.007	0.034
59667	Yes	Tala	Ots31	44.414	0.026	-0.006	0.070	-0.007
59888	Yes	Tala	Ots09	0	0.025	-0.006	0.067	-0.010
60118	No	Cluster	Ots31	48.19	0.029	0.007	0.016	0.043
60124	Yes	Cluster	Ots03	55.092	0.046	0.001	0.026	0.067
60132	Yes	Coal	Ots10	2.41	0.025	0.070	-0.005	-0.007
60283	No	Cluster	Ots26	58.615	0.029	-0.002	-0.009	0.062
60285	Yes	Cluster	Ots14	17.484	0.020	-0.002	-0.005	0.040
60332	Yes	Tala	Ots12	0.001	0.034	0.004	0.094	-0.008
60347	No	Tala	Ots33	31.021	0.053	0.004	0.095	-0.001
60582	No	Cluster	Ots16	40.867	0.018	0.004	-0.008	0.035
61154	No	Cluster	NA	NA	0.028	0.002	-0.006	0.056
61296	No	Cluster	Ots18	17.672	0.038	0.016	0.020	0.048
61345	Yes	Cluster	Ots18	29.883	0.032	-0.006	0.010	0.049
61488	No	Cluster	Ots23	21.761	0.023	0.004	0.008	0.040
61810	No	Cluster	Ots09	11.891	0.024	-0.007	-0.007	0.057
61893	No	Cluster	Ots09	34.385	0.039	0.035	0.024	0.041
62017	Yes	Tala	NA	NA	0.027	-0.006	0.058	0.008
62284	No	Tala	Ots31	4.064	0.033	-0.003	0.074	-0.008
62367	No	Cluster	Ots27	29.909	0.015	0.001	-0.006	0.036
62758	No	Cluster	Ots30	54.505	0.030	0.003	-0.006	0.057
63065	Yes	Cluster	Ots29	4.209	0.029	0.009	-0.006	0.056
63105	Yes	Tala	Ots09	28.792	0.037	0.006	0.066	0.001
63254	No	Tala	NA	NA	0.022	-0.007	0.067	-0.009
63269	No	Cluster	Ots19	51.2	0.017	-0.001	-0.004	0.038
64082	Yes	Coal	Ots33	76.386	0.023	0.072	-0.001	-0.009
64288	Yes	Coal	Ots29	55.397	0.024	0.060	-0.005	0.002
64291	Yes	Coal	NA	NA	0.025	0.071	0.001	-0.002
64319	No	Tala	Ots26	26.226	0.037	-0.004	0.082	0.010
64661	No	Cluster	Ots20	28.391	0.022	-0.004	-0.002	0.051
64738	No	Cluster	Ots26	57.318	0.044	-0.006	-0.001	0.087
64886	No	Cluster	Ots20	66.564	0.014	-0.005	-0.005	0.036
65000	Yes	Coal	Ots10	3.487	0.033	0.087	-0.006	-0.005
65113	No	Cluster	Ots24	20.675	0.014	-0.006	-0.005	0.035
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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
65234	No	Cluster	Ots06	64.324	0.032	0.014	-0.005	0.048
65356	No	Cluster	Ots05	85.096	0.020	0.000	-0.006	0.045
65466	Yes	Cluster	NA	NA	0.035	0.019	-0.004	0.043
65625	No	Cluster	Ots08	49.84	0.020	-0.006	-0.004	0.051
65879	No	Cluster	Ots01	17.728	0.016	0.001	-0.006	0.035
66125	No	Cluster	Ots07	59.18	0.019	-0.004	0.001	0.040
66360	Yes	Cluster	Ots12	10.736	0.033	0.041	-0.005	0.040
66433	Yes	Coal	Ots28	62.268	0.026	0.063	-0.006	0.001
66508	No	Cluster	Ots01	2.664	0.013	-0.005	-0.006	0.034
66791	Yes	Coal	Ots25	10.678	0.030	0.064	0.001	-0.006
66848	Yes	Tala	NA	NA	0.026	-0.006	0.066	0.002
67011	No	Cluster	Ots12	2.478	0.022	0.014	-0.005	0.034
67272	No	Coal	Ots24	13.348	0.062	0.083	0.042	0.041
67562	No	Cluster	Ots13	100.079	0.026	0.006	-0.005	0.043
67940	No	Cluster	Ots30	6.194	0.019	-0.006	0.000	0.041
68038	No	Cluster	Ots03	4.581	0.040	0.038	0.003	0.034
68561	No	Cluster	Ots28	6.768	0.015	-0.007	0.001	0.037
68590	No	Tala	Ots01	88.776	0.030	0.002	0.084	-0.004
68831	Yes	Cluster	Ots24	54.929	0.018	0.000	0.004	0.034
69027	Yes	Tala	Ots14	48.435	0.077	0.100	0.105	0.015
69145	No	Tala	Ots07	61.711	0.021	-0.004	0.064	-0.008
69475	No	Coal	NA	NA	0.038	0.109	0.002	-0.009
69633	No	Cluster	Ots33	67.106	0.033	0.051	-0.005	0.035
70054	No	Cluster	Ots13	58.524	0.016	-0.004	0.001	0.036
70063	Yes	Cluster	Ots31	25.621	0.036	0.005	0.019	0.037
70093	No	Cluster	Ots26	34.408	0.013	-0.005	-0.005	0.035
70444	No	Cluster	Ots05	0	0.022	0.008	-0.006	0.037
70623	No	Cluster	Ots20	67.508	0.029	-0.006	0.019	0.042
70980	No	Cluster	Ots13	62.729	0.017	0.003	-0.005	0.036
71081	No	Tala	NA	NA	0.041	-0.004	0.109	-0.010
71381	No	Coal	Ots09	9.05	0.036	0.079	-0.009	0.008
71514	Yes	Coal	Ots26	35.941	0.033	0.079	-0.001	0.004
71757	No	Coal	Ots07	119.092	0.061	0.101	0.001	0.048
71891	No	Cluster	Ots11	79.788	0.028	0.026	-0.001	0.041
72338	No	Coal	Ots32	54.648	0.037	0.091	-0.006	-0.005
72607	No	Cluster	Ots30	52.847	0.015	0.000	-0.006	0.034
72690	No	Cluster	NA	NA	0.033	0.046	-0.006	0.034
72961	Yes	Tala	Ots29	54.796	0.028	-0.001	0.081	-0.007
73090	No	Cluster	Ots06	11.973	0.024	-0.006	0.006	0.045
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Catalog ID         Included in final panel         Purpose         LG         CM         Overall         Coal         Tala         Cluster           73077         Yes         Cluster         Ots05         54,56         0.033         -0.003         0.079         0.000           73167         No         Coal         Ots24         1.304         0.024         0.059         -0.005         -0.002           73366         Yes         Cluster         Ots07         114.598         0.027         0.008         0.001         0.046           73402         Yes         Coal         Ots04         21.228         0.025         0.058         0.005         0.004           73578         No         Cluster         Ots07         109.462         0.017         -0.004         -0.03         0.041           73593         No         Cluster         Ots07         109.462         0.017         -0.004         -0.06           73578         No         Cluster         Ots07         109.462         0.017         -0.004         -0.016           73786         Yes         Tala         Ots07         105.594         0.030         0.012         0.009           74401         Yes									
73140         Yes         Tala         Ots25         0         0.039         -0.003         0.079         0.000           73167         No         Coal         Ots24         1.304         0.024         0.059         -0.005         -0.002           73366         Yes         Cluster         Ots07         7114.598         0.027         0.008         0.001         0.004           73402         Yes         Coal         Ots04         21.228         0.025         0.058         -0.005         0.002           73578         No         Cluster         Ots07         109.462         0.017         -0.004         -0.003         0.041           73593         No         Cluster         Ots07         109.462         0.017         -0.004         -0.003         0.041           73604         Yes         Coal         Ots15         61.404         0.027         0.073         0.018         -0.008           73786         Yes         Tala         Ots08         105.594         0.036         0.012         0.093         0.001         0.016         0.060           74511         Yes         Tala         Ots01         108.299         0.039         0.003         0.075	Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
73167         No         Coal         Ots24         1.304         0.024         0.059         -0.005         -0.002           73366         Yes         Cluster         01607         114.598         0.027         0.008         0.001         0.046           73402         Yes         Coal         Ots04         21.228         0.025         0.058         -0.007         0.044           73578         No         Cluster         0ts07         109.462         0.017         -0.004         -0.003         0.041           73593         No         Cluster         0ts01         109.462         0.017         -0.004         -0.003         0.041           73593         No         Cluster         0ts01         161.404         0.027         0.073         0.018         -0.008           73786         Yes         Tala         0ts08         105.594         0.036         0.012         0.099         -0.008           74404         Yes         Cluster         0ts30         13.08         0.025         0.026         -0.004         0.007           74404         No         Cluster         0ts33         13.08         0.025         0.026         0.004         0.039	73097	Yes	Cluster	Ots06	54.56	0.033	-0.003	0.024	0.045
73366         Yes         Cluster         Ots07         114,598         0.027         0.008         0.001         0.046           73402         Yes         Coal         Ots04         21,228         0.025         0.058         -0.005         0.002           73578         No         Cluster         Ots07         109,462         0.017         -0.004         -0.003         0.041           73504         Yes         Coal         Ots15         61,404         0.027         0.073         0.018         -0.008           73786         Yes         Tala         Ots08         105,594         0.036         0.012         0.099         -0.008           74404         Yes         Cluster         Ots01         108,299         0.039         0.004         0.016         0.60           74511         Yes         Tala         Ots01         10,282         0.033         0.003         0.007         -0.000         0.007           74823         Yes         Coal         Ots33         31,985         0.035         0.075         -0.005         0.009           74972         No         Cluster         Ots01         12,723         0.043         -0.005         0.016         0.061	73140	Yes	Tala	Ots25	0	0.039	-0.003	0.079	0.000
73402         Yes         Coal         Ots04         21.228         0.025         0.058         -0.005         0.002           73578         No         Cluster         Ots23         47.29         0.024         0.009         -0.007         0.044           73593         No         Cluster         Ots07         109.462         0.017         -0.004         -0.003         0.041           73604         Yes         Coal         Ots15         61.404         0.027         0.073         0.018         -0.008           73786         Yes         Tala         Ots08         105.594         0.036         0.012         0.099         -0.008           74404         Yes         Cluster         Ots11         104.282         0.043         0.004         0.016         0.060           74511         Yes         Tala         Ots01         108.299         0.039         0.003         0.075         -0.003           74604         No         Cluster         Ots01         12.723         0.035         0.077         -0.005         0.001         0.039           74872         No         Cluster         Ots01         12.723         0.043         0.008         0.016         0.01	73167	No	Coal	Ots24	1.304	0.024	0.059	-0.005	-0.002
73578         No         Cluster         Ots23         47.29         0.024         0.009         -0.007         0.044           73593         No         Cluster         Ots07         109.462         0.017         -0.004         -0.003         0.041           73604         Yes         Coal         Ots15         61.404         0.027         0.073         0.018         -0.008           73786         Yes         Tala         Ots08         105.594         0.036         0.012         0.099         -0.008           74404         Yes         Cluster         Ots11         104.282         0.043         0.004         0.016         0.060           74511         Yes         Tala         Ots01         108.299         0.039         0.03         0.075         -0.003           74604         No         Cluster         Ots30         3.108         0.025         0.026         -0.004         0.039           74872         No         Cluster         Ots31         12.723         0.043         -0.008         0.001         -0.005         0.061         0.061         0.061         0.061         0.061         0.053         0.074         0.088         0.023         0.004 <td< td=""><td>73366</td><td>Yes</td><td>Cluster</td><td>Ots07</td><td>114.598</td><td>0.027</td><td>0.008</td><td>0.001</td><td>0.046</td></td<>	73366	Yes	Cluster	Ots07	114.598	0.027	0.008	0.001	0.046
73593         No         Cluster         Ots07         109.462         0.017         -0.004         -0.003         0.041           73604         Yes         Coal         Ots15         61.404         0.027         0.073         0.018         -0.008           73786         Yes         Tala         Ots08         105.594         0.036         0.012         0.099         -0.008           74404         Yes         Cluster         Ots01         108.299         0.039         0.003         0.075         -0.003           74511         Yes         Tala         Ots01         108.299         0.039         0.003         0.075         -0.003           74604         No         Cluster         Ots03         3.108         0.025         0.026         -0.004         0.039           74833         Yes         Coal         Ots33         13.985         0.035         0.077         -0.005         0.009           74972         No         Cluster         Ots01         12.723         0.043         -0.005         0.016         0.061           75069         Yes         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047	73402	Yes	Coal	Ots04	21.228	0.025	0.058	-0.005	0.002
73604         Yes         Coal         Ots15         61.404         0.027         0.073         0.018         -0.008           73786         Yes         Tala         Ots08         105.594         0.036         0.012         0.099         -0.008           74404         Yes         Cluster         Ots11         104.282         0.043         0.004         0.016         0.060           74511         Yes         Tala         Ots01         108.299         0.039         0.003         0.075         -0.003           74604         No         Cluster         Ots33         3.108         0.025         0.026         -0.004         0.039           74833         Yes         Coal         Ots33         13.985         0.035         0.077         -0.005         0.001           75069         Yes         Cluster         Ots08         77.862         0.034         0.008         0.014         0.053           75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.075	73578	No	Cluster	Ots23	47.29	0.024	0.009	-0.007	0.044
73786         Yes         Tala         Ots08         105.594         0.036         0.012         0.099         -0.008           74404         Yes         Cluster         Ots11         104.282         0.043         0.004         0.016         0.060           74511         Yes         Tala         Ots01         108.299         0.039         0.003         0.075         -0.003           74604         No         Cluster         Ots30         3.198         0.025         0.026         -0.004         0.039           74833         Yes         Coal         Ots33         13.985         0.035         0.077         -0.005         0.009           74972         No         Cluster         Ots01         12.723         0.043         -0.006         0.061         0.061           75069         Yes         Cluster         Ots02         5.604         0.045         0.000         0.016         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079	73593	No	Cluster	Ots07	109.462	0.017	-0.004	-0.003	0.041
74404         Yes         Cluster         Ots 11         104.282         0.043         0.004         0.016         0.060           74511         Yes         Tala         Ots01         108.299         0.039         0.003         0.075         -0.003           74604         No         Cluster         Ots30         3.108         0.025         0.026         -0.004         0.039           74833         Yes         Coal         Ots33         13.985         0.035         0.077         -0.005         0.009           74972         No         Cluster         Ots08         77.862         0.034         -0.005         0.016         0.061           75069         Yes         Cluster         Ots01         12.723         0.043         -0.005         0.016         0.053           75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75825         Yes         Cluster         Ots31         35.869         0.037         0.072         -0.005         0.072	73604	Yes	Coal	Ots15	61.404	0.027	0.073	0.018	-0.008
74511         Yes         Tala         Ots01         108.299         0.039         0.003         0.075         -0.003           74604         No         Cluster         Ots30         3.108         0.025         0.026         -0.004         0.039           74833         Yes         Coal         Ots33         13.985         0.035         0.077         -0.005         0.009           74972         No         Cluster         Ots01         12.723         0.043         -0.005         0.016         0.061           75069         Yes         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.005         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.005         0.005         0.077           76197         Yes         Coal         Ots01         15.869         0.037         0.076         0.005         0.007	73786	Yes	Tala	Ots08	105.594	0.036	0.012	0.099	-0.008
74604         No         Cluster         Ots30         3.108         0.025         0.026         -0.004         0.039           74833         Yes         Coal         Ots33         13.985         0.035         0.077         -0.005         0.009           74972         No         Cluster         Ots01         12.723         0.043         -0.005         0.016         0.061           75069         Yes         Cluster         Ots08         77.862         0.034         0.008         0.014         0.053           75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079           76197         Yes         Coal         Ots66         12.189         0.037         0.076         0.046         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.066         -0.007	74404	Yes	Cluster	Ots11	104.282	0.043	0.004	0.016	0.060
74833         Yes         Coal         Ots33         13.985         0.035         0.077         -0.005         0.009           74972         No         Cluster         Ots01         12.723         0.043         -0.005         0.016         0.061           75069         Yes         Cluster         Ots08         77.862         0.034         0.008         0.014         0.053           75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079           76197         Yes         Coal         Ots06         12.189         0.037         0.063         0.018         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043	74511	Yes	Tala	Ots01	108.299	0.039	0.003	0.075	-0.003
74972         No         Cluster         Ots01         12.723         0.043         -0.005         0.016         0.061           75069         Yes         Cluster         Ots08         77.862         0.034         0.008         0.014         0.053           75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079           76197         Yes         Coal         Ots01         12.189         0.037         0.063         0.018         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.008           77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           7831         Yes         Cluster         Ots27         35.689         0.029         0.072         -0.004         -0.010	74604	No	Cluster	Ots30	3.108	0.025	0.026	-0.004	0.039
75069         Yes         Cluster         Ots08         77.862         0.034         0.008         0.014         0.053           75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079           76197         Yes         Coal         Ots01         56.201         0.045         0.063         0.018         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.008           77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010	74833	Yes	Coal	Ots33	13.985	0.035	0.077	-0.005	0.009
75464         No         Cluster         Ots12         91.281         0.026         0.001         -0.002         0.047           75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079           76197         Yes         Coal         Ots11         56.201         0.045         0.063         0.018         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.008           77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.001           79551	74972	No	Cluster	Ots01	12.723	0.043	-0.005	0.016	0.061
75627         Yes         Coal         Ots20         5.604         0.045         0.070         0.019         -0.007           75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079           76197         Yes         Coal         Ots11         56.201         0.045         0.063         0.018         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.008           77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           79860	75069	Yes	Cluster	Ots08	77.862	0.034	0.008	0.014	0.053
75885         Yes         Cluster         Ots31         35.869         0.037         0.002         -0.005         0.079           76197         Yes         Coal         Ots11         56.201         0.045         0.063         0.018         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.008           77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           79860         No         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510 <td>75464</td> <td>No</td> <td>Cluster</td> <td>Ots12</td> <td>91.281</td> <td>0.026</td> <td>0.001</td> <td>-0.002</td> <td>0.047</td>	75464	No	Cluster	Ots12	91.281	0.026	0.001	-0.002	0.047
76197         Yes         Coal         Ots11         56.201         0.045         0.063         0.018         -0.003           76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.008           77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           79860         No         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.055           80789         No	75627	Yes	Coal	Ots20	5.604	0.045	0.070	0.019	-0.007
76279         No         Coal         Ots06         12.189         0.037         0.076         0.046         -0.008           77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           79860         No         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839 </td <td>75885</td> <td>Yes</td> <td>Cluster</td> <td>Ots31</td> <td>35.869</td> <td>0.037</td> <td>0.002</td> <td>-0.005</td> <td>0.079</td>	75885	Yes	Cluster	Ots31	35.869	0.037	0.002	-0.005	0.079
77086         No         Tala         Ots01         108.089         0.023         -0.006         0.066         -0.007           77831         Yes         Cluster         Ots19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         NA         NA         0.017         -0.007         0.000         0.040           79860         No         Cluster         Ots16         112.704         0.024         -0.002         0.023         0.040           80431         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         <	76197	Yes	Coal	Ots11	56.201	0.045	0.063	0.018	-0.003
77831         Yes         Cluster         Ots 19         20.875         0.037         0.043         0.002         0.043           78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         NA         NA         0.017         -0.007         0.000         0.040           79860         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           80431         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots14         117.584         0.027         -0.004         0.005         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084	76279	No	Coal	Ots06	12.189	0.037	0.076	0.046	-0.008
78184         No         Coal         Ots27         35.689         0.029         0.072         -0.004         -0.010           78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         NA         NA         0.017         -0.007         0.000         0.040           79860         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           80431         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots14         117.584         0.027         -0.004         0.005         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372	77086	No	Tala	Ots01	108.089	0.023	-0.006	0.066	-0.007
78324         No         Cluster         Ots07         83.171         0.022         -0.005         0.035           79551         No         Cluster         NA         NA         0.017         -0.007         0.000         0.040           79860         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           80431         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots14         117.584         0.027         -0.004         0.005         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543	77831	Yes	Cluster	Ots19	20.875	0.037	0.043	0.002	0.043
79551         No         Cluster         NA         NA         0.017         -0.007         0.000         0.040           79860         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           80431         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots14         117.584         0.027         -0.004         0.005         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004	78184	No	Coal	Ots27	35.689	0.029	0.072	-0.004	-0.010
79860         No         Cluster         Ots07         38.386         0.026         -0.002         0.023         0.040           80431         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots14         117.584         0.027         -0.004         0.005         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.067         0.009	78324	No	Cluster	Ots07	83.171	0.022	-0.005		0.035
80431         Yes         Cluster         Ots16         112.704         0.024         -0.005         0.004         0.045           80510         Yes         Cluster         Ots14         117.584         0.027         -0.004         0.005         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.067         0.009           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009	79551	No	Cluster	NA	NA	0.017	-0.007	0.000	0.040
80510         Yes         Cluster         Ots14         117.584         0.027         -0.004         0.005         0.055           80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.075         0.000           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041	79860	No	Cluster	Ots07	38.386	0.026	-0.002	0.023	0.040
80789         No         Cluster         Ots18         8.902         0.032         -0.005         0.031         0.041           80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.075         0.000           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004 <td< td=""><td>80431</td><td>Yes</td><td>Cluster</td><td>Ots16</td><td>112.704</td><td>0.024</td><td>-0.005</td><td>0.004</td><td>0.045</td></td<>	80431	Yes	Cluster	Ots16	112.704	0.024	-0.005	0.004	0.045
80839         No         Coal         Ots22         0         0.045         0.105         0.020         0.001           81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.075         0.000           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.099           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots07         26.583         0.031         0.060         -0.003         0.026           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	80510	Yes	Cluster	Ots14	117.584	0.027	-0.004	0.005	0.055
81084         Yes         Cluster         Ots12         58.649         0.019         -0.005         -0.004         0.038           81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.075         0.000           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	80789	No	Cluster	Ots18	8.902	0.032	-0.005	0.031	0.041
81372         No         Cluster         Ots28         52.631         0.021         -0.007         -0.002         0.044           81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.075         0.000           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	80839	No	Coal	Ots22	0	0.045	0.105	0.020	0.001
81543         Yes         Tala         Ots14         106.182         0.026         0.007         0.061         0.004           81691         No         Tala         Ots07         3.831         0.029         -0.007         0.075         0.000           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	81084	Yes	Cluster	Ots12	58.649	0.019	-0.005	-0.004	0.038
81691         No         Tala         Ots07         3.831         0.029         -0.007         0.075         0.000           81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	81372	No	Cluster	Ots28	52.631	0.021	-0.007	-0.002	0.044
81746         No         Tala         Ots12         0.568         0.032         -0.007         0.067         0.009           81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	81543	Yes	Tala	Ots14	106.182	0.026	0.007	0.061	0.004
81807         No         Cluster         Ots20         20.962         0.027         -0.005         0.015         0.041           81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	81691	No	Tala	Ots07	3.831	0.029	-0.007	0.075	0.000
81927         Yes         Tala         Ots25         21.697         0.030         0.004         0.082         -0.004           82047         Yes         Coal         Ots07         26.583         0.031         0.060         -0.003         0.026	81746	No	Tala	Ots12	0.568	0.032	-0.007	0.067	0.009
82047 Yes Coal Ots07 26.583 0.031 0.060 -0.003 0.026	81807	No	Cluster	Ots20	20.962	0.027	-0.005	0.015	0.041
	81927	Yes	Tala	Ots25	21.697	0.030	0.004	0.082	-0.004
82247 Yes Cluster Ots06 64.32 0.021 -0.006 -0.006 0.050	82047	Yes	Coal	Ots07	26.583	0.031	0.060	-0.003	0.026
	82247	Yes	Cluster	Ots06	64.32	0.021	-0.006	-0.006	0.050

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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
82609	No	Cluster	Ots13	66.128	0.030	0.001	0.032	0.040
82889	Yes	Tala	Ots05	83.466	0.039	0.020	0.098	-0.008
83004	Yes	Coal	Ots08	72.304	0.035	0.083	-0.005	-0.002
83141	No	Cluster	Ots07	66.802	0.023	0.020	-0.005	0.038
83331	No	Coal	Ots19	55.852	0.023	0.071	-0.004	-0.007
83466	No	Coal	Ots06	3.702	0.027	0.058	-0.007	0.012
83732	Yes	Tala	Ots20	58.975	0.032	-0.003	0.060	0.016
83915	No	Cluster	Ots01	79.288	0.020	-0.007	0.002	0.045
84134	No	Tala	Ots02	4.828	0.021	-0.005	0.061	-0.004
84318	Yes	Cluster	Ots31	29.224	0.022	-0.006	-0.006	0.053
84598	Yes	Cluster	Ots23	53.596	0.017	-0.002	0.001	0.036
84873	No	Coal	Ots10	2.41	0.034	0.091	-0.007	-0.006
85155	No	Cluster	Ots04	2.827	0.022	0.000	-0.004	0.048
85978	No	Cluster	Ots24	14.28	0.016	-0.006	-0.006	0.040
86211	Yes	Cluster	Ots28	1.077	0.029	0.000	0.009	0.053
86395	No	Cluster	Ots07	59.46	0.017	-0.003	0.003	0.036
86912	No	Cluster	NA	NA	0.019	0.006	0.003	0.034
86916	No	Cluster	Ots13	86.624	0.014	-0.006	-0.006	0.037
87106	No	Coal	Ots29	30.096	0.058	0.067	0.044	-0.007
87297	No	Coal	Ots24	39.64	0.050	0.070	-0.004	0.031
87524	No	Cluster	Ots09	1.501	0.016	-0.005	-0.006	0.064
88246	No	Cluster	Ots23	42.56	0.036	0.010	-0.007	0.061
88339	No	Coal	Ots09	21.382	0.030	0.084	-0.001	-0.003
88890	No	Cluster	Ots07	104.665	0.026	-0.007	-0.004	0.058
88897	Yes	Cluster	Ots04	41.073	0.051	0.043	0.043	0.047
88914	No	Coal	Ots09	71.672	0.024	0.067	0.003	-0.002
89199	No	Cluster	Ots26	34.403	0.020	-0.003	0.004	0.040
89364	No	Tala	Ots13	100.079	0.044	-0.007	0.099	0.005
89377	No	Cluster	Ots02	70.088	0.018	-0.002	0.003	0.038
89430	No	Cluster	Ots28	62.267	0.030	0.018	-0.003	0.039
89492	No	Tala	NA	NA	0.025	0.004	0.065	0.000
89746	No	Cluster	Ots30	6.194	0.033	0.025	0.005	0.048
89884	No	Cluster	Ots17	17.473	0.018	-0.006	-0.006	0.044
91227	No	Cluster	Ots02	112.405	0.028	0.005	0.009	0.040
92126	No	Cluster	Ots10	108.726	0.044	0.025	0.050	0.037
92666	Yes	Coal	Ots15	24.224	0.023	0.071	-0.001	-0.007
92901	Yes	Cluster	Ots01	55.907	0.026	0.007	-0.003	0.038
93170	Yes	Coal	Ots13	1.049	0.026	0.075	-0.006	-0.004
93789	Yes	Cluster	Ots33	67.899	0.031	0.012	0.015	0.044
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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
95280	No	Cluster	Ots02	1.145	0.017	0.004	-0.006	0.035
95549	No	Coal	Ots26	0	0.036	0.072	-0.009	0.017
98206	No	Cluster	Ots22	13.096	0.014	-0.009	-0.007	0.036
98255	Yes	Coal	Ots03	118.476	0.031	0.059	-0.003	0.008
98734	No	Coal	Ots01	77.714	0.037	0.077	0.033	0.003
99972	No	Cluster	Ots28	7.233	0.022	0.006	-0.006	0.042
100237	Yes	Cluster	Ots02	35.107	0.020	0.002	0.001	0.040
100529	No	Coal	NA	NA	0.041	0.066	-0.010	0.031
100808	No	Cluster	Ots12	79.915	0.020	0.001	-0.004	0.035
101818	Yes	Cluster	Ots15	96.97	0.070	0.015	0.024	0.081
103380	Yes	Coal	Ots10	111.027	0.031	0.069	-0.004	0.005
103394	Yes	Tala	Ots14	51.038	0.051	-0.005	0.131	0.001
103395	No	Cluster	Ots03	116.137	0.015	-0.002	-0.006	0.037
103720	No	Cluster	Ots09	17.761	0.022	0.004	0.011	0.035
104500	No	Cluster	Ots09	1.501	0.006	-0.007	-0.004	0.034
104966	No	Cluster	Ots09	75.257	0.021	-0.007	0.010	0.037
105150	Yes	Tala	Ots22	63.623	0.023	-0.004	0.064	-0.003
105314	No	Cluster	Ots22	62.822	0.028	0.006	0.008	0.038
106168	No	Cluster	Ots21	59.515	0.015	-0.002	-0.006	0.035
107496	No	Cluster	Ots25	59.619	0.022	-0.006	-0.006	0.054
107933	No	Cluster	Ots15	24.176	0.017	-0.006	-0.002	0.041
108943	Yes	Cluster	Ots06	55.45	0.025	0.001	-0.002	0.052
109081	No	Coal	Ots17	0.911	0.022	0.066	0.002	-0.003
109094	No	Cluster	Ots16	113.079	0.034	0.015	0.011	0.034
109411	Yes	Tala	Ots26	26.226	0.030	-0.005	0.067	0.007
109670	No	Cluster	Ots02	99.463	0.021	-0.005	0.014	0.036
110335	No	Cluster	Ots20	77.966	0.023	-0.005	-0.004	0.055
111118	No	Cluster	Ots17	0.914	0.032	-0.001	0.008	0.059
111430	Yes	Cluster	Ots20	60.818	0.053	0.012	0.011	0.071
111926	No	Coal	Ots01	89.893	0.037	0.065	-0.006	0.024

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Catalog ID	Included in final panel	Purpose	LG	cM	Overall	Coal	Tala	Cluster
112054	No	Coal	Ots04	49.656	0.031	0.066	0.011	0.008
112461	Yes	Tala	Ots07	92.526	0.040	-0.007	0.062	0.021
113122	No	Cluster	Ots11	104.282	0.041	0.010	0.014	0.043
113376	No	Cluster	Ots14	118.431	0.020	-0.002	0.000	0.041
118266	No	Coal	Ots07	118.692	0.082	0.158	-0.001	0.006
Total Yes	183							
Total on linl	kage map		461					
Overall aver	age				0.029	0.018	0.018	0.027
Total Cluste	r	300						
Cluster aver	age				0.026	0.003	0.003	0.045
Total Coal		100						
Coal average	e				0.034	0.075	0.004	0.001
Total Tala		100						
Tala average	2				0.034	0.003	0.077	0.000