

# Public Support for Public Lands:

## Analysis of Comments Regarding Review and Potential Loss of Protection for America's National Monuments

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***Prepared by:***

Sonia Wang

Spencer Phillips, PhD

Oliver Beavers

John Stoner

***Prepared for:***

The Wilderness Society, Washington, DC



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## Author's Note

Key-Log Economics thanks the nearly one thousand volunteers (the crowd) who reviewed a random sample of thousands of comments used to train and test the machine learning algorithm that, in turn, was used to review more than 1.3 million comments publicly available by the end of the comment period. Without these volunteers, this review would not have been possible. We are grateful for the assistance of The Wilderness Society's staff in recruiting volunteers helping facilitate review of more technical comments. We also thank Kevin Hirsch for his invaluable assistance developing the code and otherwise wrangling the Google front-end that allowed the review to proceed as quickly and smoothly as possible.

Key-Log Economics remains solely responsible for the content of this report, the underlying research methods, and the conclusions drawn. We have used the best available data and methods to obtain statistically robust estimates of the degree to which individuals who commented on the proposed elimination of national monument protection. And while we do note that the sentiment we have measured among those who did comment on the proposal comports with estimates from more traditional surveys of the U.S. population, we make no claim regarding the extent to which our estimates represent the sentiment of the American people overall.

## About the Authors

**Sonia Wang** has worked largely with Key-Log examining the environmental and economic implications of unconventional natural gas development in the Marcellus Shale region as well as conducting research and GIS analysis focused on ecosystem services. She has led and worked on efforts related to crowdsourcing for comments submitted to the Federal Energy Regulatory Commission regarding two natural gas pipeline projects. A 2015 graduate of the the University of Virginia, she double majored in Environmental Science and Public Policy and Leadership. Before joining Key-Log Economics, Sonia was a participant of the UVA Conservation Scholars Program, a joint partnership between UVA and the National Fish and Wildlife Foundation, worked for The Shenandoah Watershed Study, and interned at The Wilderness Society.

**Spencer Phillips, Ph.D.** has been conducting and directing applied research into the relationships between natural resource stewardship, environmental quality, and human well-being for more than 25 years. He was a staff economist first at the White House Council on Environmental Quality during the first Bush Administration, and then at The Wilderness Society, where he later served as Vice President for Ecology and Economics Research. Dr. Phillips founded Key-Log Economics to help ensure that sound, independent economic research is available to those working to solve the critical environmental problems of our time. He is also a lecturer in economics, natural resource policy, and GIS analysis at the undergraduate and graduate level. Phillips holds a B.A. in economics from the University of Virginia and an M.S. and Ph.D. from Virginia Tech.

**Oliver Beavers**, of Trivium Financial Group, is a professional quantitative analyst with an focus on renewable energy/environmental industries. In his professional capacity, Oliver has provided modeling and analytical tools for project developers, private equity firms, government entities, and NGOs around the world. Oliver is certified by the UN Environmental Programme's collaborative center in Frankfurt as a renewable energy finance expert.

**John Stoner** is a masters candidate in the Yale School of Forestry & Environmental Studies focusing on business and the environment. He also holds a B.S. in biology from James Madison University. Prior to his internship with Key-Log Economics, he gained field and laboratory research experience for NOAA and other organizations.

## Executive Summary

On April 26, 2017, President Donald Trump signed Executive Order (EO) 13792, titled “Review of Designations Under the Antiquities Act.” The EO tasks the Department of Interior with reviewing the size and scope of 27 national monuments encompassing 11.3 million acres created under authority of the Antiquities Act since January 1, 1996 (82 FR 20429, May 1, 2017). A separate EO, number 13795 “Implementing and America-First Offshore Energy Strategy”, calls for a similar review of five Marine National Monuments that protect 217.9 million acres (82 FR 20815, May 3, 2017).<sup>1</sup>

The Antiquities Act dates to 1906 and has since then been used by almost every president since Teddy Roosevelt to designate federal lands of historic, scientific, cultural and other value as national monuments. The Antiquities Act is responsible for the preservation of Native American cultural sites like Devil’s Tower, natural wonders like the Grand Canyon and Muir Woods, and historic places like Fort McHenry, George Washington’s birthplace, and sites along the Underground Railroad.

President Trump initiated the sweeping review because he believes the Antiquities Act has been overused by previous presidents and states that it would “end another egregious use of government power” (Eilperin, 2017). Department of Interior Secretary Ryan Zinke has stated that the review is crucial for maintaining the Department of Interior’s position as steward of the land, stating that rural communities often voice concern about and opposition to monument designations but past presidents had, at times, followed through with designations despite local concerns (U.S. Department of Interior, 2017).

**Table 1: Counts of Comments Received by Type and Mode of Analysis**

	Records on regulations.gov <sup>a</sup>	Comments Received <sup>a</sup> (i.e., Persons’ opinions represented)
Unique comments & single copies of form letters <i>analyzed by the machine</i>	743,692	743,692
Unique comments & single copies of form letters <i>analyzed by human volunteers</i>	4,263	4,263
Petitions and bundles	752	562,054
<b>Total</b>	<b>748,707</b>	<b>1,310,009<sup>b</sup></b>

Notes:

- A “Record” on regulations.gov may be comprised of a single comment, or it could be an entry with multiple comments in the form of a bundle or signatures on a petition. “Comments Received” counts each single or bundled comment, and each signature on a petition, as an expression of an individual’s opinion on the EO.
- As of this writing, more than 2.8 million comments have been posted on the regulations.gov website. Our analysis is of just those comments posted by the end of the official comment period.

<sup>1</sup> See also <https://www.regulations.gov/document?D=DOI-2017-0002-0001>.

A key part of the review process has been a formal public comment period, during which members of the public could weigh in on monument designations. The Department of Interior is expected to consider this input in its final decision regarding the Executive Order.

By the end of the comment period, which ran from May 11 through July 10, 2017, the Department of Interior received input from more than 1.4 million people and organizations. These came in the form of written letters, and as eComments submitted to the regulations.gov website. The latter group included unique comments, single copies of form letters (standardized letters signed by individuals and sent as eComments), bundles (one eComment with separate submissions signed by different individuals), and petitions (one comment or letter signed by multiple individuals).

Key-Log Economics, with the help of hundreds of mostly volunteer human reviewers and artificial intelligence (AI) or machine learning, has completed an independent analysis of all of the comments (Table 1). These comments provide critical information regarding public sentiment regarding the national monuments and the proposal to rescind their designation or alter their boundaries to make them smaller. By examining and gauging the sentiment expressed in all comments received, we have made it possible for the Secretary, citizens, and advocacy organizations to know exactly how much support the people have for their national monuments.

In brief, commenters are in overwhelming support of preserving and protecting public lands and national monuments with 99.2% of all comments received opposed to the executive order. In our analysis of records reviewed by human volunteers, records mentioning a specific monument or group of monuments opposed the EO by an average of 90.9% and records mentioning a specific issue as designated by our comment review form opposed the EO by an average of 93.5%.

## Methods

For this report, we analyzed 748,707 records downloaded from regulations.gov during the public comment period using machine learning and the crowd. We began our review process by separating the records into two sets based on whether or not the record included one or more text-based attachments, which we identified by file extension (.pdf, .doc, .docx, .rtf, etc.). Some 5,030 records included one or more attachments, with the attachments being petitions, bundles of form letters, single form letters, and unique comments submitted as an attachment rather than as eComment text. In order to ensure an accurate count of **comments** included in these **records**, and also because attachments could be longer or more complex than the machine-learning could be trained to handle in the time available, we queued all records with attachments for review by trained human reviewers.

The remaining 743,692 records did not include text-based attachments and, therefore, each of these records corresponds to a single comment. From these we randomly selected more than 32,000 records/comments to create a pool from which the volunteer reviewers (see next subsection) would draw. Ultimately the volunteers completed reviews of 1,705 comments.

The comments reviewed by the volunteers serve two purposes. First, they provide a means of training and testing the machine learning algorithm before using it to gauge the sentiment expressed in all 743,692 comments embodied in records without attachments. Second, our human reviewers evaluated each comment to glean information beyond whether the commenter opposed or supported the EO. Namely, the human reviewers noted the following:

- the commenter’s state of residence, when given
- which, if any specific national monument(s) the commenter mentioned
- which, if any issue areas, such as local scenic beauty, local economic vitality, recreation, Native American heritage, etc, the commenter mentioned.

These additional data provide additional dimensions by which to stratify at least a sample of the comments received.

Of the 1705 comments reviewed, 372 were reviewed by more than one reviewer.<sup>2</sup> These multiple reviews afforded us the opportunity to double check the consistency of the reviews. Our methods for evaluating this consistency are described under the [Duplicates](#) subsection below, but briefly, we found that there was near perfect agreement from one reviewer to the next, indicating that the reviews were of uniform consistency. In the final analysis, of course, we use only one review per comment, with the review used being the first one completed by any reviewer.

### Crowdsourcing: Recruiting Volunteer Reviewers

To review the set of records without attachments, we used crowdsourcing. Both Key-Log Economics and The Wilderness Society used direct contacts and social media to recruit volunteer reviewers. In the end, we had 366 active volunteers who reviewed a total of 6,720 records, for an average of 18 reviews per volunteer.

After the volunteer registered for the project, they received an email containing a copy of the text of a comment for review and a link to the corresponding record on regulations.gov. The email also included a link to a Google form titled “National Monument Comment Review”, a link to a video providing step-by-step instructions for how to complete the review, and other details about the process. (See Appendix A for a representative copy of the email and Appendix B for images of the comment review form.)

In general, the reviewers were tasked to read through the text of the comment and, to the best of their ability, log details from the comment into the comment review form. The form included questions about the commenter’s name and state of residence (when given), which, if any, specific monuments the commenter mentioned, what issues the commenter mentioned,<sup>3</sup> and, of course, the commenter’s opinion on the Executive Order itself. This last item was logged on a 0-10 scale, with 0 corresponding to “Strongly Oppose” the EO (that is, highly supportive of national monument protection), and 10 corresponding to “Strongly Support” the EO. We also asked reviewers to record any other information they felt was important in or about the record/comment.<sup>4</sup> We then asked the reviewer if the record was a unique comment, a single copy of a form letter, a petition, or a bundle of comments. If it record was a petition or bundle, we then asked how many signatures were on the petition or how many copies of comments included within the bundle.

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<sup>2</sup> Multiple reviews were achieved as a result of the way our system assigned comments to a reviewer. Two reviewers requesting a comment for review at roughly the same time, as well as time lags between assignment and the actual review, resulted in random duplicate (or more) assignments of these comments.

<sup>3</sup> The issues mentioned include the environment in general, health ecosystem/habitat, wildlife/particular species, tribal rights and Native American interests, scenic beauty, historical/cultural artifacts and places, heritage, future generations, local economic vitality, non-motorized recreation (hiking, rafting, kayaking, backpacking, birding, etc.), motorized recreation (ATVs, etc.), fishing, hunting, energy development, grazing, use and enjoyment of surrounding lands, and a space for volunteers to fill out anything else important.

<sup>4</sup> This information later proved useful for identifying the small handful of records/comments that were completely off point, such as one commenter concerned about the ban on dogs in national parks and another applying for a job as a national park supervisor.

After the volunteer finished their substantive review of each record/comment, they had the option to “call for backup,” meaning that they believed the comment contained technical, scientific, legal, or other information that may have been too difficult to interpret and required a second look. Finally, we asked the volunteer if they were ready to review another record/comment. If they clicked “yes” they were sent an email similar to the initial email with another record/comment to review; if they clicked “no” they were sent an email with instructions on how to jump back into the process at a later time convenient to them.

### Machine Learning and Comment Classification

To classify the full set of 743,692 records/comments without text-based attachments, we employed a supervised machine learning classification model known as a linear Support Vector Machine (SVM) (see below). Supervised machine learning makes use of a predefined “training set” of data where a sample of a larger dataset is pre-classified. For this project, we focused machine learning efforts on binary classification in order to gain a clear idea of how many comments supported or opposed the EO.

In order to utilize a SVM, data must be preprocessed from comment text into numerical vectors, along with their predefined binary classification (performed by the human reviewers) to build a classifier fit uniquely to the monuments comment dataset.

To begin building the model, a significant amount of data preprocessing was performed. Comments are first pre-processed via “tokenization”, where full text comments were transformed into ordered lists of their individual words. Each set of comments was then separated according to their pro-EO/anti-EO classifications. Both lists are then “flattened” into a single list of words (rather than a list of lists of words). The word-sets in support and opposition of the EO are finalized by subtracting “boundary” vocabulary—words associated with both vocabulary lists—from the opposing set. These positive and negative word sets were then mapped to unique numerical keys, with their binary classifications, to create a vocabulary “coordinate space”.

After the coordinate space is created, each tokenized comment runs through a process which compares the comment’s vocabulary to the pre-defined coordinate space, and returns a numerical vector of the comment’s unique mapping to the coordinate space, along with the comment’s associated classification. These vectorized representations of the comment data define the model’s preprocessed sample dataset.

Once vectorized and mapped to the vocabulary coordinate space, the sample comments were tested to determine the quality of the pre-processed dataset through a process of cross-validation. In cross-validating the data, the sample dataset is split 50/50 into a training set and a testing set against which the trained classification model is tested. The cross validation algorithm runs thousands of permutations of the original sets to ensure scoring accuracy.

We had 704 unique comments to work with, which is more than that 666 necessary to obtain results with a 99% confidence interval and 5% margin of error for our total population of 743,692 comments. Thus, as we run the split, train, and test procedure using multiple permutations of training and testing sets, we find that the SVM classification model correctly classifies 96.1% ( $\pm 0.48\%$  margin of error) of all opinions correctly. It correctly classifies 13.3% ( $\pm 9.47\%$ ) of opinions in support of the EO, and it correctly classifies 99.8% ( $\pm 0.41\%$ ) of opinions opposing the EO.<sup>5</sup> The difference between the ability to classify supporting versus opposing comments is due to the small number of comments in support of the EO relative to the large number of comments opposing the EO

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<sup>5</sup> These results mean that if we repeated the procedure 100 times, the number of correctly classified comments would be within the margin of error ( $\pm$  numbers in parentheses) of the given percentage 95 times.

within the randomly selected training sets. Due to the high accuracy in predicting comments expressing opposition to the EO, we decided to target our analysis toward correctly scoring comments such comments, recognizing that the percentage of comments supportive or neutral toward the proposal would simply be one minus the percentage opposed.

An SVM classifier is an optimization algorithm which—given a pre-classified, numerically vectorized dataset such as the comment sample—fits the data to a “hyperplane”. Similar to a regression line in 2 dimensional coordinate space, the hyperplane is the “fit” of a 3-dimensional coordinate space, which maximizes the coordinate distance between classifications to ensure defined separation. This algorithm, and the Sci-Kit Learn implementation of it (employed in this study), is highly referenced in academia, and employed commercially for its accuracy in text-processing related classifications (Pedregosa et al., 2011).

After completing the cross validation scoring of the dataset, the SVM model was trained with the complete dataset. By doubling the data input, we expect an even higher classification accuracy than the score outputs. Once the model is trained with the full sample dataset, classification of the entire comment set (743,692 records/comments) is performed by tokenizing and vectorizing the comment set with the vocabulary sets used in the sample dataset, and applied using the fully trained SVM model to run the classification process. The full comment set is pre-processed using the original sample set vocabulary in order to retain consistency in the vocabulary coordinate-space used to train the model.

### Leveraging Duplicates

As noted, some records were reviewed more than once by different volunteers, giving us the opportunity to assess the consistency of our human reviewers in judging the sentiment of commenters regarding the EO. In our with attachments comment set, we had 94 duplicates, and in our without attachments set we had 372 duplicates. Some of the duplicates could be excluded from analysis when the duplication was the obvious result of technology errors (blank submissions or second submissions for the same review by the same reviewer). Once these pseudo-duplicates were removed, 459 true duplicates—that is, the same comment reviewed by different reviewers—remained.

To assess the degree of agreement between pairs of reviewers, we used Cohen's Weighted Kappa, a statistic that takes a value between 0 for complete lack of agreement between the reviewers, and 1, for complete agreement (Zaiontz, 2014). The statistic also allows difference in reviewers judgements to be weighted differently, so that the disagreement between two reviewers who score a single comment as “0” (strongly opposed to EO) and as a “10” (strongly supportive of the EO) is given more weight than a pair of reviewers who score a single comment as “3” and “4”, for example. Each duplicate comment that had 2 reviewers was analyzed in this way. The resulting Cohen’s Weighted Kappa for the records/comments with attachments was 0.931 (standard error = 0.031). For the records/comments without attachments, it was 0.916 (standard error = 0.028). These statistics indicate that relative to the judgment of other reviewers, our reviewers were highly accurate in judging commenters opinion on the EO.

Because the Cohen’s Weighted Kappa test can only be used for pairs of reviewers, we had to use a simpler percent agreement analysis to assess the consistency of reviewer’s judgment in cases where trios and larger sets of reviewers evaluated the same comment. The downside of the simpler analysis is that it can compare only two outcomes, which in our case would be opposition to or support for the EO. After reclassifying our 0-10 (oppose-support) scale recorded by reviewers to a 0/1 scale, we found 100% agreement among the groups of three or more reviewers of the same comment. This is the case for both the with-attachments and the



without-attachments samples. Finally, we note that if all duplicate reviews, including those reviewed by just two reviewers, were compared on the simpler 0/1 scale, the 100% agreement would remain.

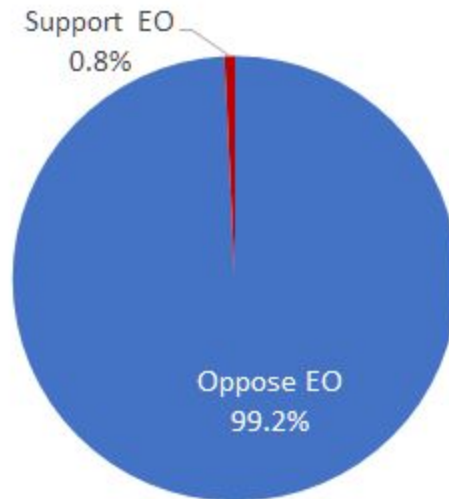
## Results

We present our analysis in the following two subsections. The first examines the sentiment from all comments reviewed by the machine and comments with text-based attachments reviewed by human volunteers. The second subsection analyzes all unique comments and copies of form letters reviewed by the human volunteers. In this latter section, we explore the broader information about particular national monuments mentioned in comments, commenters' residence, and issue areas of concern.

### Machine and Human Volunteer Results

In total, the machine reviewed 743,692 unique comments and single copy of form letters submitted to regulations.gov. These records were comments that did not contain text-based attachments. By combining the results of our analysis from volunteers that reviewed comments with text-based attachments (5,015 comments) with the comments reviewed by the machine (743,692 comments) we are able to report the sentiment of all comments submitted to regulations.gov during the official comment period. In order to accurately represent the opinions of people that had their comments or signatures submitted within a bundle or petition, we weighted bundles and petitions by the number of comments within a bundle and by the number of signatures associated with a petition. For example, a petition with a comment opposing the EO signed by 30,000 individuals is submitted as one eComment on regulation.gov. For our analysis, we treat those 30,000 signatures as individual

Figure 1. Sentiment regarding the EO from all comments reviewed (n=1,310,009)<sup>6</sup>



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<sup>6</sup> This does not include a neutral category because the vast majority of the full set of comments was evaluated using AI/machine learning which had too little predictive power to separately identify neutral comments. As explained in the section titled [Machine Learning and Comment Classification](#), the machine learning process successfully identifies comments opposed to the EO, and the balance of comments are counted here as supporting the EO.

expressions against the EO, therefore, instead of counting one comment against the EO, we count 30,000. We also assume that all comments reviewed by the machine are unique comments or copies of form letters because all bundles and petitions must be submitted with attachments.

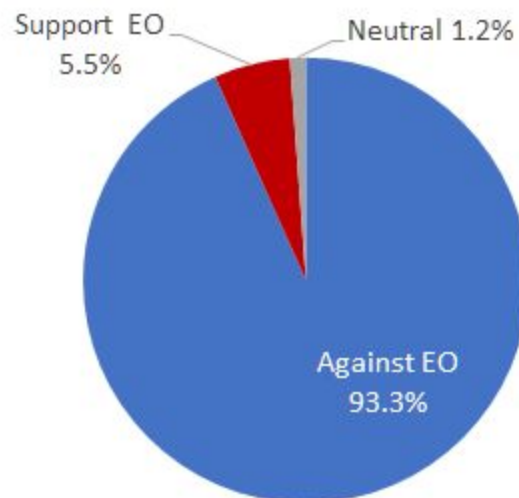
After accounting for individual expressions within petitions and bundles, we found that 1,299,853 (99.2%) of comments oppose the EO and only 10,156 (0.8%) of comments support the EO (Figure 1).

### Human Volunteer Sample Analysis

For this section, we analyzed 5,968 individual comments reviewed by human volunteers. That total includes all unique comments, all single copies of form letters, and excludes bundles and petitions. The reason for that exclusion is that ALL records downloaded from regulations.gov that had an attachment, such as a bundles or petitions, were reviewed by human volunteers. If we were to include those in the analysis presented here, the sentiment in the petitions and bundles would be amplified relative to the otherwise randomly selected individual comments, and that would skew the results in the direction of the sentiment expressed in the petitions and bundles. Note, however, that bundle sentiments and petition sentiments are fully represented in the preceding section, where records and comments of all types are counted.

Our comment review form had volunteers rank the opinion of comments on a 0-10 likert scale (See Appendix B), with 0 meaning that the commenter is strongly opposed to the EO (that is, the commenter likes monuments and wants the administration to leave the monuments designations as they are) and 10 meaning the commenter strongly supports the EO (that is, the commenter thinks monuments can or should be eliminated or reduced in size). We found that 93.3% of comments were opposed to the EO (those comments ranked 0-4 on the likert scale), 5.5% supported the EO (comments ranked 6-10 on the likert scale), and 1.2% were neutral (a 5 on the likert scale). See also Figure 2.

**Figure 2. Sentiment on the EO from all sample of comments reviewed by human volunteers (n=5,968).**



Many comments mentioned a specific monument or a group of monuments of special concern. From the comments that did mention a monument (or multiple monuments), Bears Ears, Grand Staircase-Escalante, and

Organ Mountains-Desert Peaks were the most mentioned by commenters both for and against the EO (Table 2). Table 2 lists the total number of times the monument was mentioned in all 5,968 comments by whether or not they are for or against the EO as well as the percentage of support or opposition. The base for all percentages of comments listing a monument is the total number of comment letters mentioning that specific monument. We do not, in other words, count comments that do not mention a monument in the percentage calculations.

**Table 2. Sentiment regarding the EO among commenters who mentioned specific monument(s).**

Monument Name	Oppose EO %	Support EO %	Neutral %
Berryessa Snow Mountain (n=218)	97.2%	1.4%	1.4%
Basin and Range (n=0)	0%	0%	0%
Bears Ears (n=2931)	95.6%	3.7%	0.8%
Canyons of the Ancients (n=197)	94.4%	3.6%	2.0%
Carrizo Plain (n=263)	97.7%	1.5%	0.8%
Cascade Siskiyou (n=231)	87.0%	11.3%	1.7%
Craters of the Moon (n=155)	98.7%	0.0%	1.3%
Giant Sequoia (n=288)	95.1%	3.1%	1.7%
Gold Butte (n=151)	92.1%	6.6%	1.3%
Grand Canyon-Parashant (n=206)	95.6%	2.4%	1.9%
Grand Staircase-Escalante (n=723)	95.3%	4.1%	0.6%
Hanford Reach (n=235)	99.1%	0.0%	0.9%
Ironwood Forest (n=167)	87.4%	10.8%	1.8%
Mojave Trails (n=203)	95.1%	3.0%	2.0%
Organ Mountains-Desert Peaks (n=542)	92.6%	6.6%	0.7%
Rio Grande del Norte (n=390)	97.7%	1.5%	0.8%
San Gabriel Mountains (n=240)	94.6%	3.8%	1.7%
Sand to Snow (n=188)	95.7%	2.1%	2.1%
Sonoran Desert (n=165)	92.7%	5.5%	1.8%

Table 2, continued

Monument Name	Oppose EO %	Support EO %	Neutral %
Sonoran Desert (n=165)	92.7%	5.5%	1.8%
Vermilion Cliffs (n=166)	95.8%	3.0%	1.2%
Upper Missouri River Breaks (n=210)	94.3%	4.3%	1.4%
Katahdin Woods and Waters (n=322)	89.4%	9.3%	1.2%
Marianas Trench (marine monument) (n=143)	94.4%	2.1%	3.5%
Northeast Canyons and Seamounts (marine monument) (n=248)	95.6%	3.6%	0.8%
Pacific Remote Islands (marine monument) (n=155)	92.9%	4.5%	2.6%
Papahānaumokuākea (marine monument) (n=232)	94.4%	3.0%	2.6%
Rose Atoll (marine monument) (n=137)	94.2%	2.9%	2.9%

If noted in the comment, we also recorded where the commenter resides. A total of 3,937 commenters specified their state or territory of residence in the comment. We found that Utah (779 comments), California (578 comments), and New Mexico (494 comments) had the highest number of comment submissions. Of all commenters that specified a location, 80% of the commenters resided in a state where a monument is under review. Table 3 displays the results by state, territory, or other location.

Table 3. Sentiment regarding the EO, by commenter’s place of residence.

Residence	Oppose EO %	Support EO %	Neutral %
Alabama (n=7)	100.0%	0.0%	0.0%
Alaska (n=15)	100.0%	0.0%	0.0%
Arizona (n=242)	93.0%	6.6%	0.4%
Arkansas (n=6)	100.0%	0.0%	0.0%
California (n=578)	93.8%	5.5%	0.7%
Colorado (n=276)	97.1%	2.5%	0.4%
Connecticut (n=14)	100.0%	0.0%	0.0%

**Table 3, continued**

<b>Residence</b>	<b>Oppose EO %</b>	<b>Support EO %</b>	<b>Neutral %</b>
District of Columbia (n=37)	83.8%	10.8%	5.4%
Delaware (n=4)	100.0%	0.0%	0.0%
Florida (n=41)	100.0%	0.0%	0.0%
Georgia (n=14)	100.0%	0.0%	0.0%
Hawaii (n=22)	86.4%	13.6%	0.0%
Idaho (n=42)	92.9%	4.8%	2.4%
Illinois (n=43)	95.3%	4.7%	0.0%
Indiana (n=15)	100.0%	0.0%	0.0%
Iowa (n=12)	100.0%	0.0%	0.0%
Kansas (n=6)	100.0%	0.0%	0.0%
Kentucky (n=8)	75.0%	25.0%	0.0%
Louisiana (n=4)	100.0%	0.0%	0.0%
Maine (n=121)	75.2%	23.1%	1.7%
Maryland (n=22)	95.5%	0.0%	4.5%
Massachusetts (n=43)	90.7%	7.0%	2.3%
Michigan (n=32)	100.0%	0.0%	0.0%
Minnesota (n=23)	100.0%	0.0%	0.0%
Mississippi (n=1)	100.0%	0.0%	0.0%
Missouri (n=20)	90.0%	10.0%	0.0%
Montana (n=155)	93.5%	5.2%	1.3%
Nebraska (n=5)	100.0%	0.0%	0.0%
Nevada (n=58)	72.4%	24.1%	3.4%

**Table 3, continued**

Residence	Oppose EO %	Support EO %	Neutral %
New Hampshire (n=14)	92.9%	7.1%	0.0%
New Jersey (n=27)	100.0%	0.0%	0.0%
New Mexico (n=494)	93.9%	5.7%	0.4%
New York (n=67)	100.0%	0.0%	0.0%
North Carolina (n=25)	92.0%	8.0%	0.0%
North Dakota (n=0)	0.0%	0.0%	0.0%
Ohio (n=25)	88.0%	8.0%	4.0%
Oklahoma (n=11)	100.0%	0.0%	0.0%
Oregon (n=105)	76.2%	21.0%	2.9%
Pennsylvania (n=31)	96.8%	3.2%	0.0%
Rhode Island (n=9)	100.0%	0.0%	0.0%
South Carolina (n=9)	100.0%	0.0%	0.0%
South Dakota (n=7)	85.7%	0.0%	14.3%
Tennessee (n=9)	100.0%	0.0%	0.0%
Texas (n=48)	95.8%	4.2%	0.0%
Utah (n=779)	90.9%	8.7%	0.4%
Virginia (n=39)	87.2%	10.3%	2.6%
Vermont (n=18)	100.0%	0.0%	0.0%
Washington (n=265)	98.5%	0.8%	0.8%
West Virginia (n=2)	100.0%	0.0%	0.0%
Wisconsin (n=23)	95.7%	4.3%	0.0%
Wyoming (n=40)	95.0%	5.0%	0.0%

**Table 3, continued**

Residence	Oppose EO %	Support EO %	Neutral %
Puerto Rico (n=0)	0.0%	0.0%	0.0%
American Samoa (n=2)	0.0%	50.0%	50.0%
Guam (n=1)	0.0%	0.0%	0.0%
US Virgin Islands (n=1)	100.0%	0.0%	0.0%
Another Country (n=20)	100.0%	0.0%	0.0%

**Table 4. Sentiment regarding the EO among residents of states where the national monuments under review are located.**

State	Oppose EO %	Support EO%	Neutral EO%
Arizona (n=242)	93.0%	6.6%	0.4%
California (n=578)	93.8%	5.5%	0.7%
Colorado (n=276)	97.1%	2.5%	0.4%
Hawaii (n=22)	86.4%	13.6%	0.0%
Idaho (n=42)	92.9%	4.8%	2.4%
Maine (n=121)	75.2%	23.1%	1.7%
Montana (n=155)	93.5%	5.2%	1.3%
New Mexico (n=494)	93.9%	5.7%	0.4%
Nevada (n=58)	72.4%	24.1%	3.4%
Oregon (n=105)	76.2%	21.0%	2.9%
Utah (n=779)	90.9%	8.7%	0.4%
Washington (n=265)	98.5%	0.8%	0.8%

We also included a section for volunteers to make note of any mentions of one or more of a pre-defined set of issues mentioned within the comment. The Department of Interior did not provide an official list of issues they would specifically be considering during their review so we created a list of issue areas that we believed would

be of common concern for commenters. There was also a space for volunteers to enter additional issues that were not covered by the list. We did not have the volunteers take note of whether or not an issue was mentioned positively or negatively in the comment, therefore, we made the assumption that if an issue was mentioned, the sentiment of how the commenter felt about the issue would correspond to the overall sentiment of the comment. For example, if a volunteer found that the commenter is opposed to the EO and the comment mentions habitat, we assume the commenter also believed the EO would have a negative impact on habitat.

Table 5 displays the total number of times an issue is mentioned as well as the percentage of support or opposition to the EO. Like our analysis of above, for any given issue, our analysis considers only those comments that mention the issue. Therefore, the base for all percentages of comments expressing a particular view about

**Table 5. Sentiment regarding the EO, by issue area.**

Issue Area	Oppose EO %	Support EO %	Neutral %
Historical/Cultural Artifacts and Places (n=2469)	98.5%	1.1%	0.4%
Future Generations (n=2210)	98.5%	1.1%	0.4%
Heritage (n=2024)	98.4%	1.3%	0.3%
Scenic Beauty (n=1960)	98.5%	1.2%	0.3%
Local Economic Vitality (n=1886)	93.5%	5.9%	0.6%
Tribal Rights and Native American Interests (n=1813)	98.4%	1.2%	0.4%
Environment in General (n=1631)	98.0%	1.2%	0.8%
NON-motorized Recreation (hiking, rafting, kayaking, backpacking, birding, etc.) (n=1344)	97.6%	1.9%	0.4%
Healthy Ecosystem / Habitat (n=1131)	98.2%	1.6%	0.2%
Wildlife / Particular Species (n=955)	96.6%	2.8%	0.5%
Use and Enjoyment of Surrounding Lands (n=704)	96.2%	3.4%	0.4%
Energy Development (n=453)	91.8%	7.7%	0.4%
Fishing (n=450)	93.6%	5.8%	0.7%
Hunting (n=282)	91.5%	7.8%	0.7%
Grazing (n=211)	69.2%	28.0%	2.8%
Motorized Recreation (ATVs, etc.) (n=143)	76.9%	21.0%	2.1%



the effect of the EO in the issue area (positive or negative) is the total number of comment letters that mention the issue. We do not consider comments that are silent on the particular issue in our percentage calculations. We found that on average, 93.5% of commenters who mentioned an issue opposed the EO.

## Conclusions

The analysis presented above sets two important markers. First and more generally, it is possible, through the use of new techniques and technology to ensure that the opinion of all persons interested in or concerned about public policy proposals can be counted and brought to bear decisionmaking. By combining crowdsourcing and machine learning, we were able to evaluate well over a million public comments in a very short period of time (~two weeks), and in a manner that provides a high level of confidence in the result.

Second, and specific to Executive Orders 13792 and 13795, the public overwhelmingly opposes rescinding or reducing the protection afforded 27 national monuments and 5 marine national monuments established since 1996. This opposition cuts across geography, issue areas (environment, Native American rights and culture, recreation, economy, etc.), and it is not specific to any national monument.

Taken together this study shows that the people can and have been heard, and that they have spoken clearly and forcefully for the continued protection of America's public lands and the natural, scenic, sacred, culturally and historically significant places they contain.

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## Appendix A: Instructions for Volunteers

Volunteers received an email similar to the following after registering to help with the comment review.

Thank you, [VOLUNTEER NAME], for volunteering to help analyze public comments on the Department of Interior's "Review of Certain National Monuments Established Since 1996". Key-Log Economics is managing this effort for The Wilderness Society, a conservation organization that has been working to protect our heritage of wildlands since 1935. Your participation is crucial and will help make sure that all of the comments are heard and that National Monuments receive due consideration.

In this email, we include the text of a comment that has not yet been reviewed and a link to the original comment on the government's website. We also give you a link to our brief "Comment Review" form, where you'll record summary information about the content of the comment. If you can't get to this right now (or in the next 12 hours), no worries: this comment will be assigned to another volunteer, and you can jump back in at any time by [clicking this link](#). We'll fill in the signup form for you, and when you click the "submit" button on the form, we'll send a different comment for you to analyze.

To view a brief video on how to use the comment review form, please [click this link](#).

Ready to roll?

- First, read over the text of the comment at the bottom of this email.
- If you like, or if the comment is not displaying properly in your email window, you can [click this link](#) to view the comment on the official website.
- Next, please open the [Comment Review form from this link](#) and follow the instructions to complete your review of this comment. Note that this link is specific to THIS comment. Please don't use the link twice or for any other comment.

You'll see that the last item on the form is how you'll let us know if you are ready to do analyze another comment. If you say "yes" things will cycle back and you'll get another email similar to to this one with another comment to review and a fresh link to the form. If you say "not now", you'll get a different email that you can use to jump back in at a time more convenient for you.

Each comment may only require a couple minutes to review, and once you've done one or two, it will get even faster.

On behalf of our whole team, thank you again!

Sonia Wang

Key-Log Economics

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### COMMENT TEXT

I am appalled that our treasured national parks and monuments, like the Bears Ears National Monument, are up for review at all. Bears Ears is one of our nation's newest monuments – the American people are very lucky to now call this ancient site covering an expanse of 1.3 million acres a public resource protected for future generations. The monument protects ancient sites that are sacred to the Native American tribes in southern Utah's red-rock country. Utah is greatly enriched by the Bears Ears National Monument. Bears Ears National Monument also provides incredible spaces for outdoor activities– it is one of best places in the world for rock climbing and bouldering. These public lands need to stay in public hands. No president has EVER attempted to abolish a national monument, and an attack on one park is an attack on all our parks. Secretary Zinke, I am adamantly opposed to any effort to eliminate or diminish protections for Bears Ears or any other national monument, and I urge you to support our public lands and waters and recommend that our current national monuments remain protected.

## Appendix B: Comment Review Form

# National Monument Comment Review

Thank you so much for helping to analyze the input received by the Trump administration regarding its "Review of Certain National Monuments Established Since 1996." You don't have to be an expert on the issues to help out, but your help will enable detailed policy analysis and efforts to bring better information to bear on decisions about these monuments.

Briefly, here's how to complete your review of each comment:

1. Read over the comment in the email you received or on the official [regulations.gov](https://www.regulations.gov) website. (Please open the comment on the website if there were any attachments.)

2. With the comment open in one window and this form visible in another, please answer each of the questions below as completely as you can and to the best of your ability. For some questions, you'll select a pre-defined answer from a set of options or a drop-down list. For others you'll need to type an answer. (The first two items, your email address and the ID of the comment you are reviewing, are filled in for you.)

3. Use the last question on this form to let us know whether you want to review another comment right away or if you would prefer to take a break.

Remember that we are trying to capture the facts and sentiment conveyed in the comment as accurately as possible, regardless of what the opinion expressed might be. Our goal is to have a fair and accurate accounting of what people have said to the administration regarding its proposal.

Most of all, thank you again for your help so far.

Please visit [keylogeconomics.com/national-monuments-comment-review](https://keylogeconomics.com/national-monuments-comment-review) for further information about this project.

Sonia Wang  
Key-Log Economics

\* Required

Email Address \*

Your answer

### Comment ID \*

Your answer

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### Commenter Name

If the commenter gives his/her name, please type (or copy and paste) it here.

Your answer

---

### Commenter Residence

If given, please select the U.S. State, Territory, or "other country" from the dropdown list.

Choose



### Monuments Mentioned

Please check the box next to any particular national monuments mentioned in the comment. (Check all that apply, but if the comment references ALL national monuments, you can leave these all unchecked.)

- Basin and Range
- Bears Ears
- Berryessa Snow Mountain
- Canyons of the Ancients
- Carrizo Plain
- Cascade Siskiyou
- Craters of the Moon

- Giant Sequoia
- Gold Butte
- Grand Canyon-Parashant
- Grand Staircase-Escalante
- Hanford Reach
- Ironwood Forest
- Mojave Trails
- Organ Mountains-Desert Peaks
- Rio Grande del Norte
- Sand to Snow
- San Gabriel Mountains
- Sonoran Desert
- Upper Missouri River Breaks
- Vermilion Cliffs
- Katahdin Woods and Waters
- Marianas Trench (marine monument)
- Northeast Canyons and Seamounts (marine monument)

- Pacific Remote Islands (marine monument)
- Papahānaumokuākea (marine monument)
- Rose Atoll (marine monument)

### Issues Mentioned

Please check the box next to any particular issues they mention in their comment. (Check all that apply.)

- Environment in General
- Healthy Ecosystem / Habitat
- Wildlife / Particular Species
- Tribal Rights and Native American Interests
- Scenic Beauty
- Historical/Cultural Artifacts and Places
- Heritage
- Future Generations
- Local Economic Vitality
- NON-motorized Recreation (hiking, rafting, kayaking, backpacking, birding, etc.)
- Motorized Recreation (ATVs, etc.)
- Fishing
- Hunting
- Energy Development

- Grazing
- Use and Enjoyment of Surrounding Lands
- Other: \_\_\_\_\_

### Opinion on Executive Order

How strongly does the commenter oppose or support the Executive Order's intention to eliminate or reduce the size of national monuments? If the commenter seems to be neutral (does not express a preference one way or another), that would be a "5". If the comment is blank, perhaps with nothing more than something like "Dear Ryan Zinke" (it happens), leave this question blank.

0 1 2 3 4 5 6 7 8 9 10

<p>Strongly Oppose (Commenter likes monuments and wants the administration to leave the monuments as they are.)</p>	<p>○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○</p>	<p>Strongly Support (Commenter thinks monuments can or should be eliminated or reduced in size.)</p>
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### Other Information

Please list anything else the commenter said that you think is important but has not been covered in previous questions. You can also use this space to explain a response above that you are not quite sure of.

Your answer \_\_\_\_\_

### Comment Type \*

Is the comment a petition (one comment with multiple signatures), a bundle (multiple identical or similar comments), or a single copy of what appears to be a form letter? If not, does the comment appear to be a unique letter written by the commenter? (For Petitions and Bundles, you'll record the number of signatures or copies in the next section.)

- Petition
- Bundle
- Single copy of a form letter
- Unique Comment

### Call for backup?

After reviewing this comment, if you feel that it contained technical, scientific, legal, or other information that you were unsure of how to interpret, please check the "Yes" button below, and we'll have an expert take a second look at this comment.

### Backup Requested

- Yes
- No

### Thank You!

To review another comment now, pick "Yes" below. We'll send you an email with a link to the next unreviewed comment and a custom link to another copy of this form with the new comment's ID.

If you're ready for a break, pick "Not now", and we'll instead send an email that you can use to start again at any time.

Either way, thank you again for taking the time to review this comment.

### Review Another? \*

- Yes
- Not now

BACK

SUBMIT