

**National Land Remote Sensing Education Outreach and Research
Activity (NLRSEORA)**



-FINAL REPORT-

**AmericaView: A National Remote Sensing Consortium
Grant Award Number: G18AP00077**

AmericaView Technical Report for Grant Year 2021

Period of Performance

**18 September 2021 to 17 September 2022
(With NCE from 18 Sept 2022 to 30 June 2023)**

Submitted to:

**USGS Project Officer and Grant Administrator
AmericaView Consortium Board of Directors**

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Glossary of Terms

AGI	American Geosciences Institute
ARSET	Applied Remote Sensing Training
ASPRS	American Society for Photogrammetry & Remote Sensing
AV	AmericaView
AWS	Amazon Web Service
CO-I	Co-Investigator
DOI	Department of the Interior
DRR	Disaster Risk Reduction
EAA	Earth as Art
ED	Executive Director
EO	Earth Observations or Earth Observatory
EOD	Earth Observation Day
EOS	Earth Observing System
EROS	Earth Resources Observation and Science
ESA	European Space Agency
ESRC	Earth Sensors and Research Committee
ESRI	Environmental Systems Research Institute
ESW	Earth Science Week
FY	Fiscal Year
GEE	Google Earth Engine
GY	Grant Year
HIA	High Impact Activity
LST	Landsat Science Team
LWG	Landsat Working Group
NASA	National Aeronautics and Space Administration
NCE	No Cost Extension
NLI	National Land Imaging
NLRSEORA	National Land Remote Sensing, Education, Outreach and Research Activity
OBIA	Object Based Image Analysis
OLI	Operational Land Imager
OSM	Open Street Map
PI	Principal Investigator
PD	Program Director
SBSWG	Satellite Based Sensor Working Group
SPC	Strategic Partners Committee
SC	State Coordinator
STEAM	Science, Technology, Engineering, Art, and Mathematics
STEM	Science, Technology, Engineering, and Mathematics
sUAS	Small Uncrewed Aerial System
SV	StateView
UAS	Uncrewed Aerial System
UAV	Uncrewed Aerial Vehicle
USGS	United States Geological Survey
VAP	Value Added Provider
WBM	Winter Business Meeting

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1 INTRODUCTION AND OVERVIEW

1.1 REPORT PURPOSE AND STRUCTURE

This report summarizes the activities for the United States Geological Survey (USGS) National Land Imaging (NLI) program Grant Award G18AP00077 for the National Land Remote Sensing Education, Outreach and Research Activity (NLRSEORA) to AmericaView (AV) from 18 September 2021 to 17 September 2022, with a no-cost extension (NCE) from 18 September 2022 to 30 June 2023. This report satisfies the grant year reporting requirements for Period 4 of the NLRSEORA award. The report contains a detailed description of completed activities for grant year 2021 (GY21). Metrics for this report were captured, interpreted, and presented by AV Staff.

The report is organized in four sections with associated supporting material available for download at links noted within the report. Section One provides an AV and StateView (SV) consortium overview. Section two presents selected accomplishments by AV SV members, or at the national level, to meet the USGS NLI grant objectives. Section three is a brief grant year review. Section four is a fiscal summary and report of grant fund expenditures.

1.2 AMERICAVIEW – A NATIONAL CONSORTIUM

AmericaView, a 501(c) (3) non-profit education and research organization, is a nationally organized network of state-based consortia with more than 20 years of experience advancing the availability, timely distribution, and widespread use of remote sensing data and technology for education, outreach, and research. AV SV members are led by 41 local universities that facilitate state-based consortia consisting of more than 300 local, state, and regional members with a directive of advancing the widespread use of remote sensing data and technology through education and outreach, workforce development, applied research, and technology transfer. Each SV delivers remote sensing related educational, research, and operational products and services that meet the needs of the state, local, and regional communities that it serves. The success of AV is a direct result of the power of collegiality and of the *power of the AmericaView network*.

The concept of a national consortium to advance the adoption and use of remote sensing technologies and products at the state level was conceived in 1998 with the establishment of OhioView. Expansion to the national level was authorized by the United States Congress and achieved by AV. AV was incorporated as a non-profit in 2003, and began with ten members. Today AV is a locally facilitated and nationally coordinated consortium that has grown to 41 SV members (Figure 1). AV SV Principal Investigators (PIs), Co-Investigators (Co-Is), and State Coordinators (SCs) include some of the foremost remote sensing scientists and educators in the nation, and include editors of major journals, authors of key remote sensing textbooks, and directors of major research laboratories. These remote sensing professionals impact the Earth science community in a wide variety of research and education areas including, but not limited to, environmental monitoring; water quality, quantity, and utility studies; plant-phenology camera studies; natural resource management; traditional and precision agriculture; and, disaster response and risk reduction. Collectively, the PIs of AV are responsible for millions of dollars of competitive grants, lead quality research programs nationally and internationally, and successfully disseminate their research outcomes through publications, presentations, and the web.

necessary. The Board is elected from active SVs or other individuals having explicit interest in the mission of AV. Board terms are three years in length and are staggered to ensure that the retention of critical organizational knowledge is maintained and transmitted to new Board members. Board member elections occur yearly. The Board is guided by officers and those are chairperson, vice-chairperson, secretary, and treasurer (Table 1).

Although AV has no formal employees, it operates with an annually-assessed Board-approved staff comprised of an executive director, program director, financial manager and information analyst, and bookkeeper. The duties of the AV staff are to guide the national AV organization; to ensure the mission, goals, and objectives of projects are accomplished; to develop and sustain beneficial relationships; and to transparently keep and share records of the fiscal accountability of the organization. The AV staff work in a virtual format from various locations.

AV is primarily funded by the USGS. Although an independent organization, AV maintains close ties to the USGS to ensure that needs and objectives of USGS/NLI, as they pertain to this grant agreement, are successfully addressed. This close working relationship is facilitated by regular communication between the AV Staff and the assigned USGS liaison and contract financial officer. USGS transmits needs, questions, and programmatic requests through the liaison to AV staff. AV staff can then respond to those requests or identify AV members that can assist in the response.

Table 1. List of AV Board of Directors and Staff during GY21 (left) with modifications and after June 30, 2022 (right) due to annual Board of Directors elections.

Board of Directors	July 1, 2021 to June 30, 2022	Board of Directors	July 1, 2022 to June 30, 2023
Mr. Brent Yantis	Chair	Dr. John McGee	Chair
Dr. John McGee	Vice Chair	Dr. Lindi Quackenbush	Vice Chair
Ms. Roberta Lenczowski	Secretary	Ms. Robin McNeely	Secretary
Dr. Rebecca Dodge	Treasurer	Dr. Rebecca Dodge	Treasurer
Dr. Russell Congalton	Director	Ms. Mary O'Neill	Director
Ms. Mary O'Neill	Director	Mr. Brent Yantis	Director
Ms. Robin McNeely	Director	Dr. Brad Shellito	Director
Dr. Lindi Quackenbush	Director	Dr. Nancy French	Director
Dr. Brad Shellito	Director	Dr. Joseph Knight	Director
Staff		Staff	
Mr. Christopher McGinty	Executive Director	Mr. Christopher McGinty	Executive Director
Ms. Lisa Wirth	Program Director	Ms. Lisa Wirth	Program Director
Ms. Jeanie Congalton	Financial Manager	Ms. Jeanie Congalton	Financial Manager
Ms. Eufemnia Gough	Bookkeeper	Ms. Eufemnia Gough	Bookkeeper

1.4 NATIONAL AND STATEVIEW CHANGES

During any given grant period, there are changes at both the national and membership levels. At the SV level, as PIs retire or step aside, the AV staff, Board, and membership have the opportunity to vet and approve new SV PIs. This process involves a thorough review of the prospective PI credentials and interests by the AV staff, Board, and membership. The Board and membership then vote to accept or reject the PI. In GY21, AV welcomed two new StateView Associate members along with two new PIs to

lead those programs. Dr Robert Washington-Allen is the PI of NevadaView and Dr. Qiusheng Wu is the PI of TennesseeView and both are in the early stages of developing their SV programs.

2 AMERICAVIEW GRANT YEAR 2021 OBJECTIVES AND KEY SUCCESSES

2.1 NLRSEORA OBJECTIVES

2.1.1 Objective 1 - Gather Nationwide Remote Sensing Data and Information Requirements

AV National Work Plan

Periods 1-5: AV's national and state consortia will collect information on the ability or identified weaknesses of existing remote sensing data and derivative products to meet the needs of the user constituencies.

In grant year 2021, grant period 4, numerous SVs continued research projects that benefit from the Earth Observation Enterprise. The result of interagency coordination and cooperation has provided opportunities for projects to bring different sensors and platforms together for projects that benefit multiple user constituencies. A few examples are noted below. AV will continue to identify, encourage, and engage in projects throughout the duration of the grant that help take the pulse of the user community to identify new approaches to combine new and existing data sets.

- ArkansasView applied radar interferometry from multiple platforms to study ground deformation in Central Arkansas. The project produced maps that will allow researchers to explore potential landslides and subsidence due to mining activity, sinkhole development, and hydrocarbon/groundwater extraction.
- CaliforniaView promoted the synergistic use of remote sensing imagery from different sensors to guide and facilitate adaptive management at a finer scale for near-real time tree crop monitoring for improved management by crop producers.
- HawaiiView conducted research comparing the use of WorldView-2 and Landsat 8 for island-wide mapping of Uluhe (*Dicranopteris linearis*) fern, an important plant for soil stabilization, water quality, and endangered species habitat.
- MississippiView conducted an analysis of Landsat 7, Landsat 8, and Sentinel-2 data for tracking sediment and thermal plumes of freshwater inputs to the Mississippi Sound. This research allows for a more thorough understanding of the recovery of the western Mississippi Sound, the potential of oyster reefs to recover and be productive, a science-based approach to selecting new areas for oyster and ecosystem restoration and the beginning of a long-term set of data describing conditions in the Mississippi Sound.

AV Satellite-Based Sensor Working Group (SBSWG) Work Plan

Period 2-5: The SBSWG (now the Earth Sensors and Research Committee) and AV staff will review the results of information and data collection and reporting efforts in Period 1 and will be responsible for revising the data collection and workshop procedures each year, as appropriate. Needs and requirements workshops will be conducted in each of Period 2-5. The SBSWG will be responsible for collecting and disseminating recent developments of each state consortium and incorporation into future lesson plans and research. All information will be shared with USGS staff.

During GY21, AV collaborated with USGS to develop a series of application-based questions that would help identify potential new uses of LandsatNext data. A working session was conducted with USGS personnel and the AV membership during the AV annual meeting that was held in Fort Collins, Colorado from May 2-4, 2022. This working session allowed USGS to work with the AV membership to identify uses of the data beyond what was originally planned and to refine the series of questions that would be sent out to the AV membership at a later date. The results from this questionnaire can be viewed [here](#).

Encouraging New Affiliates Work Plan

Periods 1-5: As AV continues to pursue the USGS NLI objectives, the AV national consortium will seek new affiliate state members who are interested in furthering the NLRSEORA objectives. Ultimately, AV will strive to include all fifty states, the District of Columbia, and U.S. territories as appropriate levels of funding are realized.

Following modification to the AmericaView bylaws by the Board, staff, and approved by the membership, AmericaView now recognizes two levels of membership, Full and Associate Members. Full Members are entitled to all voting rights and opportunities to request continued annual funding when available. Associate Members are entitled to all voting rights but are not eligible for sustained annual funding until the level of Full Membership is achieved. To reach Full Membership status, an Associate Member must demonstrate successes in program and consortium development, participation in AmericaView committees, and a demonstrated desire to further the vision and mission of AmericaView. Efforts to encourage associate development were continued during GY21 by building upon efforts that began in GY20 with Tennessee and Nevada. Dr. Qiusheng Wu from the University of Tennessee Knoxville, and Dr. Robert Washington-Allen from the University of Nevada, Reno were both brought into Associate Member status as the PIs for TennesseeView and NevadaView.

AmericaView StateView Activities Work Plan

Period 1-5: All AV members will continue to develop and build local SV consortiums through relevant and timely High Impact Activities (HIAs) and by interfacing with local users. SVs will summarize these relationships and issues, educational opportunities, and outreach opportunities initiated through these consortia developments.

AmericaView has steadily developed its national consortium since 2003. The maintenance of the consortium enables AV to better understand and serve the remote sensing needs of the residents in the states that it serves. Encouraged growth of the national consortium and state consortia strengthened AV's networking, remote sensing expertise, and knowledge sharing collaboration. AV continues to work to sustain and strengthen its consortium through each SV that consists of varying numbers of members. Figure 2 describes the wealth of activities conducted by all of the SVs in GY18 – GY21 to benefit their local consortia, which in turn; strengthens AmericaView's national impact. An analysis of the GY18 - GY21 timeframe shows the COVID-19 pandemic impacts, adaptations, and recoveries of the SV programs. GY18 was the only year during this grant agreement completed before the COVID-19 pandemic. The following grant years showed impacts to numerous SV activities (education and outreach activities, EOD/GIS Day outreach, and posters presentations), where in-person work was not possible. As of GY21, those areas are rebounding and are gradually increasing to pre-pandemic levels as in-person activities are becoming possible. As it was necessary for SVs to redesign their programs due to the pandemic, two areas in particular were greatly benefited. SVs were able to apply larger amounts of their funding towards financially supporting undergraduate and graduate students. Many also began developing more online content for use by teachers and students to meet the increasing demands for materials that could be used in a virtual environment.

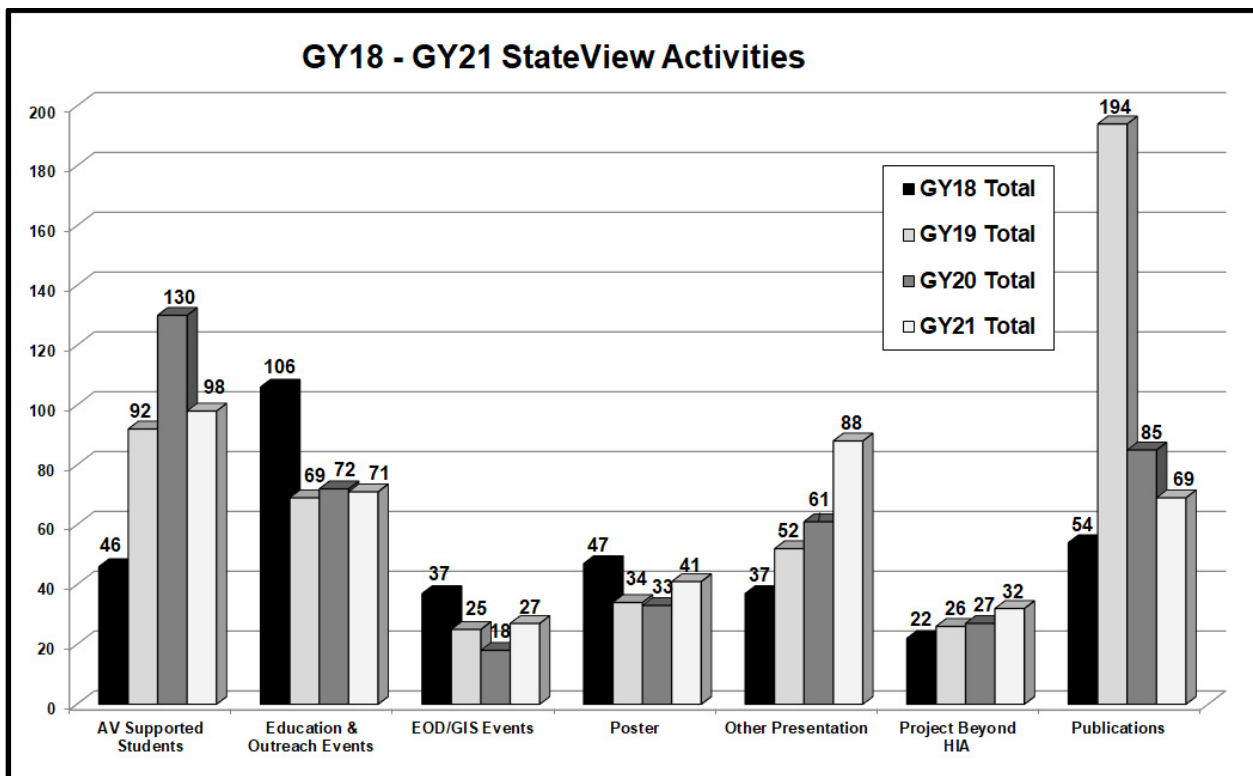


Figure 2. Categories and totals of StateView activities from GY18 – GY21.

During GY21, all SVs invested time in maintaining and expanding their local state consortia to the benefit of USGS NLRSEORA priorities and objectives. Notably, DelawareView taught the state’s first dual enrollment course in *Geospatial Science and Technology* at Newark High School. Newark High School is one of the most diverse public high schools in the state and the students enrolled in this initial geospatial course offering represented the school’s socioeconomic and ethnic diversity. The course introduced students to the geospatial technologies of GIS, GPS, and remote sensing using mini-lectures to illustrate core principles, and hands-on activities to solidify concepts. AlaskaView updated two open access online introductory courses, *GIS Foundations* and *Remote Sensing of Wildfires* geared toward students and professional beginners in the geospatial field. These updated courses run on edX.org (a global nonprofit online education and learning platform) and are available to anyone at no charge. The courses are self-paced (consisting of video lectures, illustrations, interactive exercises, and quizzes). Another significant benefit of AV funding is the ability of the SVs to leverage those dollars in support of larger projects that are primarily funded from a different source. The SVs that leveraged funding in support of larger efforts are shown in Table 2. Efforts such as these dramatically increase the return on investment for the Department of the Interior by funding the AV program. The success of AmericaView is due to the power of the network, made possible through each member state consortium.

Table 2. A selection of StateViews that leveraged funding in conjunction with their AV activities.

State	Project Title	External Funding Agency
AK	Seasonal Snow Evolution in Caribou-Poker Creeks Research Watershed	NASA SnowEx
AL	Mapping Universities with GIS Certificates	City of Auburn
CO	The Wildfire Impacts on Surface UV Irradiance by Ground Measurement	USDA NIFA
DE	Development of 6th Grade Geography Curriculum	Delaware Department of Education
HI	High Resolution Island-wide Vegetation Mapping and Modeling for the Prioritization of Ecosystem Restoration and Habitat Protection for the Hawaiian Petrel on Lanai	USGS
IA	GIS K-12 Outreach in Iowa	Iowa Geographic Information Council, William Penn University, Indian Hills Community College
IN	A Toolkit for Establishing Airport Catchment Areas	Transportation Research Board, the Airport Cooperative Research Program
IN	Collaborative Research: CyberTraining: Implementation: Medium: Cyber Training for Open Science in Climate, Water and Environmental Sustainability	NSF
IN	Invasive Plants in Southern Forests: Impact on Fuels and Implication to Fire Behavior	US Forest Service
IN	Promoting Economic Resilience and Sustainability of the Eastern US Forests	USDA, NIFA
KS	Rapid Imager Viewer GEE Application	Kansas Water Office
KS	Sentinel GreenReport GEE Application	Kansas Biological Survey
LA	2022 Rising Water Camp	NSF
LA	Developed Floor Puzzles for EAA	Louisiana National Guard, RAC
LA	Lafayette Science Museum LA as Art Installation	Private Donors, Louisiana National Guard, Regional Applications Center
ND	North Dakota Geospatial Summit Student Trip	University of North Dakota
NY	Deriving Lake Phytoplankton Information from Satellite Imagery	New York State Department of Environmental Conservation
PA	Assessment of a Decade of Urban Expansion in Moon and Marshall Townships	Clarion University
PA	GeoTech Center EOD Virtual Event	GeoTech Center
PA	Tropical Storm Ida Flooding Manayunk/East Falls, Philadelphia	Villanova University
PA	Use of Remote-Sensing Data and Sediment Traps to Evaluate Erosion in Zero-Order Streams	Bucknell University
VT	First Responder Geospatial Training	FEMA
VT	HAB Mapping & Monitoring	USGS Water Center
VT	Snowpack Mapping & Monitoring	USACE
WV	WV Elevation and LiDAR Download Tool	West Virginia GIS Technical Center, FEMA
WY	Rapid Flood Mapping Project	Wyoming NASA Space Grant

Metrics Assessment of Progress

Periods 1-5: Within the Technical Report for each grant period, and at annual meetings, AV SVs will summarize their experiences with the consortia's remote sensing data and information requirements gathering efforts. Metrics, to be determined by the SBSWG, may include the following: issues faced at local levels; data and sensors used to address issues; successes of data and sensors to solve local issues; and needs or shortcomings of data and sensors to solve local problems. AV will report these summarized metrics to USGS/NLI in annual reports.

During GY19, the AV committees and working groups were reorganized to increase participation, collegiality, and efficiency. The Satellite-Based Sensor Working Group was combined with the Water Working Group and, the UAS Working Group to form the Earth Sensors and Research Committee. This committee continued in GY21 and has broadened the discussions on different Earth sensors that are relevant to the work of AV member states and USGS NLI priorities. A remote sensing data and information requirements gathering effort was developed with USGS staff and was conducted as part of the AV annual meeting that was held in Fort Collins, Colorado in May 2022. Results from this survey can be found [here](#).

Consortium development will continue to be closely tracked by AV. SVs will report annually on the status of their consortium development efforts. Metrics, to be determined by the ED, may include the following: name(s) and roles of consortium members; additions to local consortiums; benefits those members provide to the consortia, and how new and current members help the SV meet their HIAs and project objectives.

AV tracks the number of consortium members for each SV as a part of our annual metrics gathering effort. SV consortium totals per SV in GY21 are shown in Figure 3. Consortium member affiliation per SV, with the categories of Federal, Local, University, and Private are also tracked and shown in Figure 4. During GY21, the consortium participation from greatest to least was: University, Local, Federal, and Private. Tracking the sector diversity of SV networks is important in an effort to better characterize the unique users at the local level. Understanding this metric allows AV to communicate and understand the needs of Earth observation resources to meet local needs and translate that information to the Federal level. Each state has a diverse consortium, which is the mechanism that makes the programs effective and beneficial to each community and is illustrative of the reach and influence of the AV network.

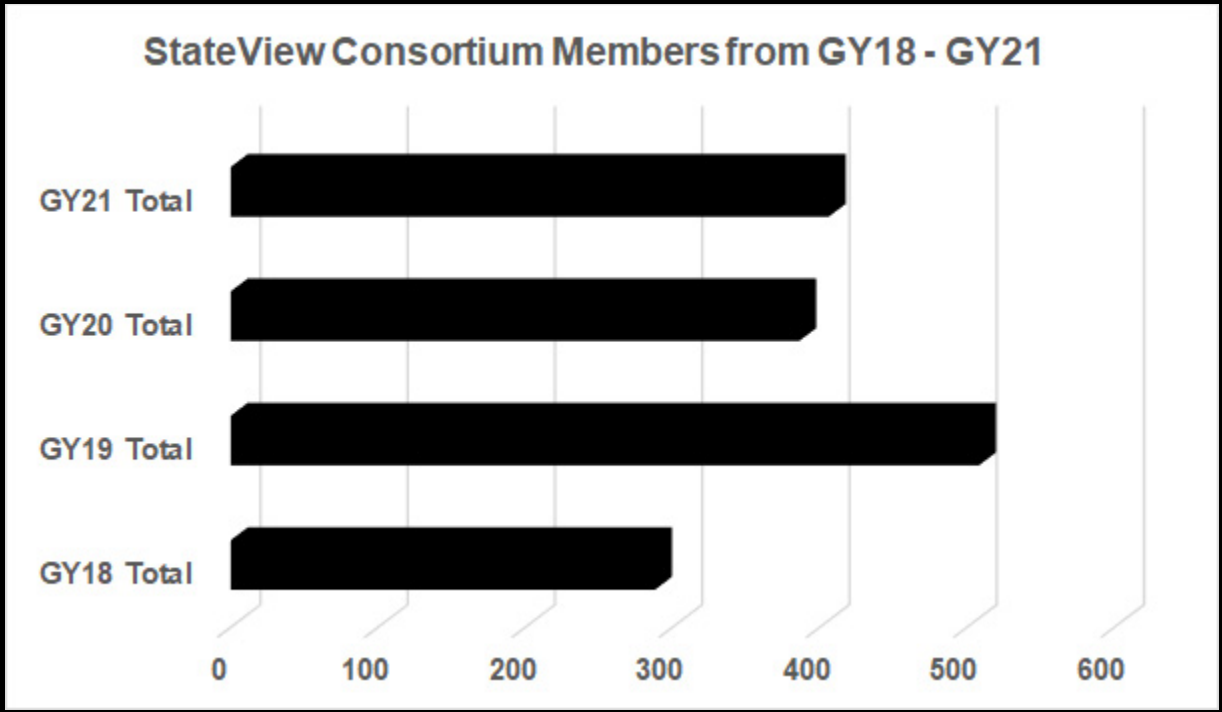


Figure 3. Total StateView consortium members from GY18 - GY21.

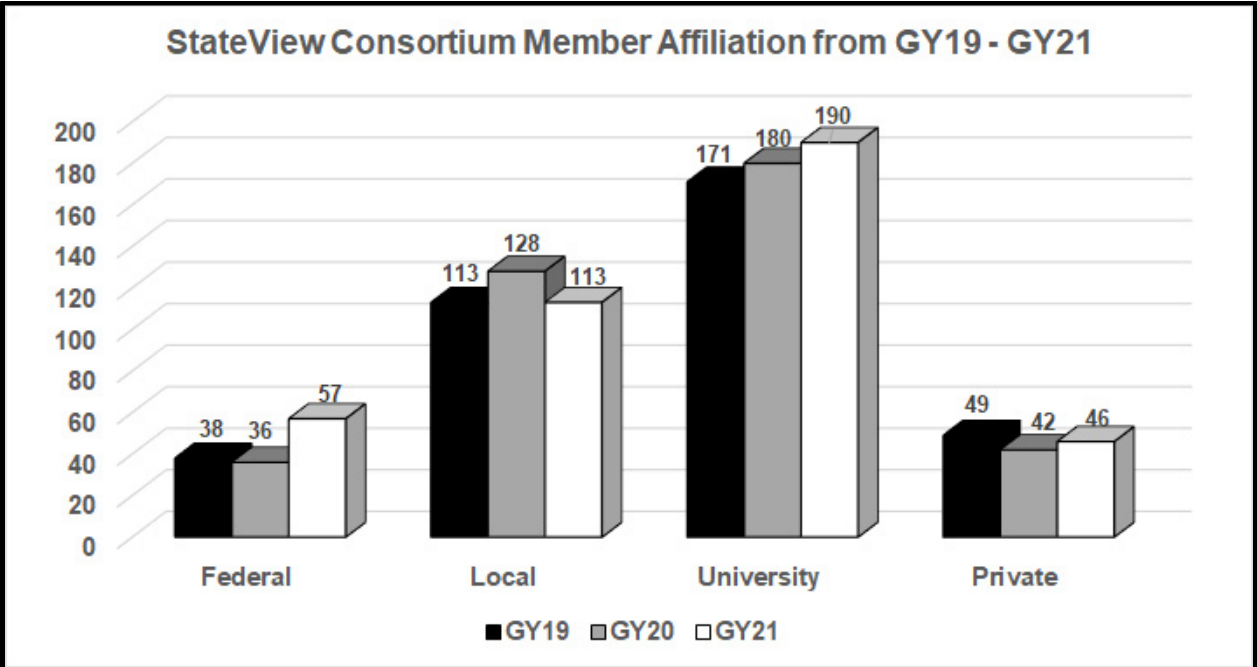


Figure 4. Consortium member affiliation consolidated for all StateViews (Federal, Local, University, and Private) from GY19 - GY21.

2.1.2 Objective 2 - Establish Strategic Partnerships

AmericaView National Activities Work Plan

Periods 1-5: AV's Executive Director will look for opportunities to grow the strategic partnerships. The ED will attend national meetings and symposia as an advocate for the NLI NLRSEORA program objectives and will actively participate to help establish the positive awareness that stimulates the formation of effective and mutually beneficial alliances.

The AV ED is responsible for the long-term viability of the AV program and to identify opportunities to advocate for the NLI NLRSEORA program. During GY21 the ED has attended meetings, conducted outreach, and worked to develop relationships to further this objective. Five unique and high-profile opportunities occurred in GY21, where AV built partnerships within NLI and NASA to provide a one-government approach to successfully carrying out the events. AV supported USGS NLI in planning and participating in the Landsat 9 transition event, held on August 10-11, 2022 at the Earth Resource Observation and Science Center (EROS) in Sioux Falls, South Dakota. The AV ED provided an overview of the organization's success and representatives from South DakotaView provided presentations on their long history with the Landsat program and partnerships with EROS. AV was proud to support NLI at the Pecora 22 Conference, in October 2022, by organizing a STEM event that hosted high school students from the American Indian Academy of Denver and Compass Academy (Figure 5). This event allowed the students to learn about remote sensing and Earth observation and how they can be used for their future educational pursuits. AV was invited by USGS to take part in the production of an Eyes on Earth Podcast, [Intro to AmericaView](#). This was an ideal platform to tell the AV story and the importance of Landsat and Earth observation education. With the assistance of the AV board and staff, Dr. Russell Congalton (NHView Director) took the lead in compiling a highlight article for publication in *Photogrammetric Engineering and Remote Sensing*, titled "[AmericaView and its Landsat Connection](#)". This article was published in July 2022 and highlighted AV's involvement with the Landsat program over the last 20+ years. Finally, AV was honored to be the recipient of the 2021 William T. Pecora team/group award [presented](#) at the Pecora 22 conference in Denver, Colorado in October 2022.

An additional partnership that was created during GY21 that developed from working with our USGS NLI partners was a collaboration with Ladies of Landsat, particularly Nikki Tulley of NASA. Ms. Tulley provided a connection to a Bureau of Indian Education school in New Mexico, Chichiltah – Jones Ranch Community School. The FlyHigh4Geo project, through funding from the National Geographic Society, enabled AV members and Ms. Tulley to travel to the school and conduct a geography focused Earth Observation [STEM event](#) for the K-8 students. The FlyHigh4Geo program supported students in expanding their understanding of geography and developed important and valuable relationships between Chichiltah – Jones Ranch Community School, AV, NASA, and USGS for future educational opportunities.



Figure 5. Students from the American Indian Academy of Denver participating in the Virtual Reality Pecora 22 STEM event activity.

The ED will alert the AmericaView Board and SVs to announcements about possible private and public grants that, if won, would encourage leveraging AV and partners' expertise and advancing appreciation of the great value of remote sensing. These opportunities will enable AV and its members to leverage projects and funding to further the overall beneficial impact of the NLRSEORA grant objectives and mission of USGS NLI.

AV gained significant ground in identifying strategic opportunities outside of the NLRSEORA grant in GY21. While no NLRSEORA funds were used for this particular effort, it is important to note because it allows AV to identify leveraging opportunities to further the vision and mission of DOI, USGS, and NLI in the areas of Earth observation education. Two NSF GEOPATHs proposals were successful and awarded to OhioView and LouisianaView in GY20 and they both successfully launched their programs during GY21. Both of these new projects provided opportunities for collaboration and participation between different SVs. The OhioView led program had five different SV PIs participating in lectures and hands-on activities and the LouisianaView led program involved two different SV PIs.

Industry representatives will periodically be invited to provide technical presentations at AV monthly members meetings and the FTM and WBM gatherings. Engagement with these experts encourages more strategic interactions, keeping both AV and the invited guest(s) aware of joint opportunities for collaboration.

To foster collegiality among SV members throughout the year, AV conducts SV update presentations at the monthly membership meetings. This has been well received from USGS and the AV membership. Technical presentations from industry representatives and other SVs are held at the AV Earth Sensors and Research Committee meetings and are organized by the committee chair, ED, and PD. Table 3 lists each presentation that was held during the fourth grant year at the Earth Sensors and Research Committee monthly meetings.

Table 3. List of presentations held at AmericaView Earth Sensors and Research Committee meetings during GY21.

Month	Speaker	Organization	Title
October 2021	Jeff Masek	NASA	Landsat 9 Update
December 2021	Joe Mascaro	Planet	Earth Science at the Speed of the Anthropocene
December 2021	Yufang Jin	CaliforniaView	Advancing Tree Crops and Rangeland Monitoring with Planet Imagery
January 2022	Danielle Gollon	LP DAAC	Updates from NASA's LP DAAC
February 2022	James L. Smith	TNC LANDFIRE	The LANDFIRE Program: An Interagency Public-Private Data Creation Partnership
March 2022	Joe Morrison	UMBRA	Commercial SAR and the Promise of Cheap Monitoring
May 2022	Dana Peterson	KansasView	The Sentinel Green Report
June 2022	Neheet Trivedi	Cloud Factory	Labeling Geospatial & Remote Sensing Data: How Machine Learning is Helping to Address the World's Environmental Challenges
July 2022	Joe Knight	MinnesotaView	Recent Research and Plans for the ESRC

2.1.3 Objective 3 - Promote Undergraduate and Graduate Research and Employment Skills

AmericaView National Work Plan

Periods 1-5: Undergraduate and graduate students will participate in the development and distribution of Earth Observation Day (EOD) materials within participating SVs.

Earth Observation Day was successful in GY21 with sixteen SVs that held 27 events across the nation, reaching over 1,880 individuals. GeorgiaView held an EOD event with high school juniors and seniors and four teachers (Figure 6). Students explored environmental science labs and geospatial technologies, offered by ten University of West Georgia students and faculty members. The EOD event was also featured in the Times Georgian, a local newspaper (<https://tinyurl.com/bde63fe5>). Several other notable EOD activities are listed below, where undergraduate and graduate students were engaged in the development of the events and distribution of materials.

- New MexicoView partnered with the New Mexico State University Department of Language & Linguistics to recruit a graduate student to complete the Spanish translation of the 2022 EOD poster.
- PennsylvaniaView celebrated EOD with a Map-A-Thon of the Monongahela River Area
- DelawareView celebrated EOD by being a guest speaker at GIS Career Exploration and presenting "My Job Talks" on how they got into GIS as a career.
- WyomingView conducted three separate EOD activities during GY21. The first included fourth graders and were shown the association between rivers and human settlements, and growth over time. Second included Sheridan High School students that were introduced to images acquired in the visible and invisible regions of the spectrum and their utility for monitoring Earth surface features. Third, Laramie Middle School students used ALTA II Spectrometers for

measuring spectral reflection of 2 sets of leaves, and later connected those measurements to satellite observations.



Figure 6. GeorgiaView students celebrating Earth Observation Day at the University of West Georgia.

Periods 1-5: AV and SVs will promote research publications and presentations by students through diverse media, including in-person presentations, webinars, email blasts, and social media (including Facebook, Twitter, and YouTube).

- AlabamaView trained graduate and undergraduate students in using remote sensing methods for environmental applications and the students produced a series of informational videos that are shared on the Alabama Environment Awareness [YouTube](#) Channel. Additionally, one student conducted a research project on U.S. Universities with GIS Certificate Programs and developed a [StoryMap](#) with the results.
- DelawareView supported student research through their dual enrollment course in Geospatial Science and Technology at Newark High School. Three students developed StoryMaps to showcase their projects: <https://arcg.is/1zW9m9>, <https://bit.ly/39xbgkL>, <https://arcg.is/1HnLW00>.
- MontanaView awarded 11 fellowships to students at six institutions across Montana.
- IndianaView provided scholarships for six students (five graduate and one undergraduate) from the member educational institutions to participate in remote sensing and geospatial projects. Each of the student provided a fact sheet about their project and a testimonial on how the scholarship assisted them and can be viewed on the IndianaView [website](#).
- KansasView worked with a local Native American to provide 24mini scholarships to support students enrolled in remote sensing and GIS courses. Four of the students developed StoryMaps to showcase their work: [World Food Tour](#), [Hidden but not Forgotten](#), [Longest Cave Systems in Nations State Parks](#), [Haskell Wetland Waterbody and Wildlife](#).

Metrics Assessment of Progress

Periods 1-5: At the national level, the responsible committees will collect and summarize reports from every SV with an EOD effort, following past practice. SVs will report the outcomes of student engagement efforts at the SV level. Other metrics, to be requested by the ED, may include the following:

tracking number of students involved in SV-funded research or other employment opportunities; tracking the number of publications and presentations by AV-funded students. AV will report these summarized metrics to USGS/NLI in annual reports.

Throughout GY21, 30 SVs financially supported a total of 98 undergraduate and graduate students with AmericaView funds. The students worked on a variety of remote sensing related topics. Some SVs focused on education and outreach training and materials development, others provided an opportunity to learn about GIS and remote sensing in a professional environment, and others were supported for a Master's thesis and PhD dissertation. Selected projects are listed below and the total number of publications created in GY21 is shown in Figure 7.

- ArkansasView supported three graduate students at the University of Arkansas as summer interns: two of them had the opportunity to enhance their research and remote sensing skills. The third graduate student had an internship fully sponsored by the Arkansas Geological Survey (AGS) to study active landslides in Arkansas. His summer internship extended the collaboration ties with AGS and provided him with the opportunity to continue studying active landslides in his MS degree using advanced machine learning techniques under the supervision of Dr. Mohamed Aly.
- CaliforniaView trained a Master's student to develop feature level fusion to integrate NAIP and UAV super high spatial resolution imagery with Planet satellite imagery for almond tree monitoring and yield estimation.
- IdahoView, in collaboration with Idaho Geological Survey and with the Burlington Northern Santa Fe rail, supported a graduate student in researching geohazard threats to transportation corridors that will be useful for operations planning, monitoring, and management.
- KentuckyView supported a student working on inland water quality and quantity mapping for the State of Kentucky, specifically focused on harmful algal bloom prediction and monitoring, using Landsat-8 and Sentinel-2 datasets, and Google Earth Engine.
- New YorkView supported a graduate student focused on classifying types of wetlands in New York State using a range of input data types, including both spectral and spatial data from Landsat and Sentinel sensors and features derived from those data such as multi-spectral indices and texture.

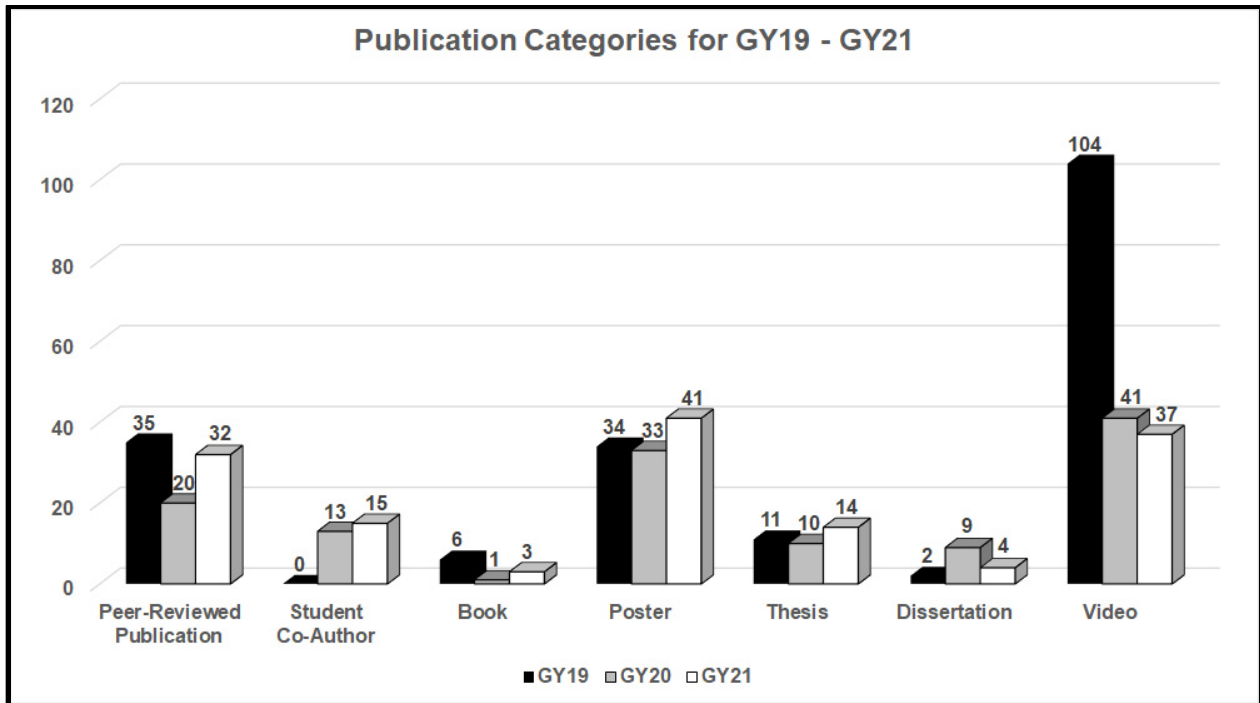


Figure 7. Categories of publications from GY19 through GY21 for all SVs.

2.1.4 Objective 4 – Advance Education and Training, Technology Transfer, and Outreach

Originally conceived and established to facilitate free and rapid access to Landsat data, AV has long been successful at facilitating the sharing of remote sensing data and technology to meet needs at state, local, and regional levels. Through time, and advancements in technology and open data policies, the mission of AV has shifted from access and availability, to one of education, training, technology transfer, and outreach. AV will increase the remote sensing competency of the nation’s current and future workforce. Quantifiable objectives include supporting remote sensing science instruction in K-12 grades to improve STEAM education and to strengthen national science education standards; utilizing AV’s academic university network to improve the quality of instruction at the university and college level; and increasing the employability and effectiveness of workers by introducing remote sensing skills into the existing workforce. AV, through SV consortia, and as part of the NLRSEORA program, will continue to reliably and successfully conduct education and training, technology transfer, and outreach activities at the community, state, regional, and national levels. These activities will continue to include the development of education and training materials; establishment and refinement of curricula; hosting of local, state, national workshops; and, conducting outreach locally and nationally.

- Twenty-three SVs conducted K-12 teacher training workshops and reached 270 teachers.
- TexasView continued their successful teacher training workshops. New this year was the development of the [Watching Over Texas from Space](#) lesson book, which is an Earth Observations education resource for grades 4 -12 covering Earth Science and Environmental Science Standards.
- VirginiaView refined and redesigned two STEM-based curriculum guides to support the needs of pre-college educators. These curriculum guides include *An Introduction to Precision Agriculture* and the *sUAS Manual Flight Exercises* manual. These resources, which were piloted with

educators in 2022 and will be further disseminated across the state in 2023 and can be accessed through the VirginiaView [website](#).

- UtahView produced three informational posters in celebration of the 50th anniversary of the Landsat program that were used at the Pecora 22 conference. The posters focused on the rich history and pioneers of the Landsat program: *Remembering Charles J. Robinove*, *Project EROS*, and *The Pioneers of the Landsat Program*. All resources are available on the AV [website](#).

AmericaView National Work Plan

Periods 1-5: The AV Education Committee will continue to organize and celebrate Earth Observation Day. AV will continue its national participation in the American Geosciences Institute (AGI) Earth Science Week (ESW) (which is held annually in October). AV's website published ArcGIS and Google Earth-based lessons, as well as additional Earth imagery games and puzzles, will be updated and expanded to provide complementary materials for educators and students.

AV (in collaboration with NASA, USGS, and AGI) developed a poster for Earth Observation Day and for inclusion in the Earth Science Week packet that is hosted on the [AV website](#). Additionally, more than 10,000 posters were distributed by mail in AGI ESW packets to educators throughout North America. All materials related to [EOD](#) can easily be searched and downloaded from the AV website.

Periods 1-5: AV will continue to facilitate interaction and association of SVs with the International Charter in support of disaster risk reduction, mitigation, and support. AV will establish the Disaster Risk Reduction (DRR) working group of interested SVs and partners to focus on use, training, and deployment of remote sensing data and technology. AV members will share their expertise in disaster analysis with others via online and in person AV meetings, via email blasts, and at regional/national conferences. The shared information will include identifying or sponsoring training opportunities offered by the USGS, suggestions for how to manage data flow and data provision to first responders, research results, and approaches to post-disaster land and water cover analysis.

An overall reorganization of committees and working groups began during GY18 and a DRR working group was not established, but work involved with this effort was undertaken within the newly formed Strategic Partners Committee (SPC) in GY19.

LouisianaView held their 23rd Data Mining Virtual Workshop for Emergency Geospatial First Responders during GY21. Through the cooperation of the LouisianaView consortium members and co-sponsored with the local USGS liaison, this workshop was offered free to everyone interested in up-to-date information on data availability for the geospatial emergency responder. One hundred and sixty-six (166) geospatial first responders from more than 15 different countries attended this workshop held June 2, 2022 via Zoom/In-person from the UL Lafayette Regional Application Center. This one-day workshop hosted 16 speakers from multiple Federal, State and Private Response Teams, each presenting their data, websites, links, and contacts while also fielding questions live from those in attendance, proving again and again what a cohesive and informed network of geospatial responders can mean to the inhabitants and economic base within Louisiana, the Gulf of Mexico region and the Caribbean.

Periods 1-5: AV will enhance its digital presence by actively enhancing its website (www.americaview.org) and sustaining a social media presence (Facebook, Twitter, and YouTube) to share and promote remote sensing resources, educational material, tools, and data, and to facilitate the

development of nationwide and global partners. A reassessment of the AV University educational portal will be conducted and suggestions for updates to support AV and NLI objectives will be developed.

Websites are essential to sharing important information and educational resources. During GY21, the AV website had 24,228-page views from 140 different countries. Though, these statistics do not include information about how many visitors returned or even how long they visited the website. Such information would help identify the level of interest in particular topics or how often returning visitors seek updates or more in-depth study, underscoring confidence in the quality of content.

Social media is an important way of sharing resources, tools, and successes. During GY21, AV utilized Twitter, LinkedIn, and YouTube to transmit these materials.

During GY21, AV's website and social media served the following:

- 51,800 Twitter impressions
- 7,855 views on YouTube
- More than 496 hours of educational video viewing

These interactions tell only a small portion of the story. Many of these views led to the access and download of remote sensing educational materials, access to online (digital) resources, and the viewing of educational videos ranging from training modules for Google Earth Engine, remote sensing of wildfire, and open source software. In addition to AV's website and social media presence, each SV maintains its own website and/or social media account. During GY21, there were a total of 171,054 unique visits to all of the SV websites/social media accounts combined.

Periods 1-5: AV will continue to educate local and national decision makers. AV SVs will be encouraged to schedule visits with decision makers in Washington, D.C., and their own states, where they will provide educational updates and have educational discussions regarding the successes of their SV efforts and the benefits of the NLRSEORA program overall. These visits provide the opportunity for PIs and accompanying students to explain how remote sensing programs, such as those supported by NLI, have been beneficial to natural resource management issues within their state.

Education of national leaders and decision makers is a critical component of NLRSEORA. Historically, AV has worked to share the success stories of each SV member. These stories have been shared through annual national outreach and educational activities. These efforts have evolved throughout the years of the current grant agreement due to executive directives and effects of the COVID-19 pandemic. During period 4 of the NLRSEORA grant, congressional outreach was conducted with selected members of Congress by holding virtual meetings with staffers and SV PIs to educate them about the positive impacts the AV program has accomplished in those states and to show the importance of the Landsat program. While no grant funds were used to conduct these educational meetings, it is an important effort to continue for the benefit of USGS NLI and AV.

Metrics Assessment of Progress

Periods 1-5: Through annual SV reporting, AV SVs will track and report on the success and impacts of education, training, technology transfer and, outreach at the national and SV level. For example, the number of projects, descriptions of educational and training materials, offered (and links if they are offered online), technology transfer successes, and numbers of outreach opportunities offered and

numbers of participants/workforce personnel reached. During the RCA process, each SV will describe the proposed HIA and answer specific questions regarding the applicability of the effort to specific objectives of the grant proposal. At the end of the funded period, each SV will assess the status of the original intent and report outcomes. Those will be summarized in AV's Technical Report submitted to USGS/NLI at the end of each period. Each SV will submit a fact sheet on each HIA at the end of a grant period, describing impact with numerical and textual summaries as appropriate. These fact sheets will be peer-reviewed and approved by the ED and PD before cumulative information is provided in the Technical Reports.

[Each SV submitted a factsheet that summarized their work during GY21.](#) Additional metrics chosen to describe the *overarching impact on populations served* for objective 4 during GY21 included:

- Number of students supported by AV funds
- Number of education and outreach events
- Number of Earth Observation Day or GIS Day events
- Number of posters developed
- Number of other presentations outside of the previous categories
- Other projects leveraged with SV funds beyond their HIA
- Number of publications

Results shown in Figure 2 illustrate how SVs have programs have developed in the first four years of the award and Figure 8 shows the number of individuals that were positively impacted through those programs. There are several features that should be noted. GY18 was the first year of this grant agreement and was the only year that was not impacted by the COVID-19 pandemic. In GY19, there was a dramatic shift in producing online content as shown in the "Publications" category. While that remained a significant effort in GY20, SVs were able to redirect more of their funding to support students since campus COVID-19 protocols had been well established by that point in time. In GY21, the publication numbers are returning to pre-pandemic levels. Education and outreach events and EOD/GIS events continue to fall lower than their pre-pandemic levels. Looking at the impact of education and outreach/EOD events at the local level in more detail, Figure 8 compares the total numbers of participants for each category for GY18 - GY21. Numbers of K-12 students that were able to participate in educational activities were dramatically greater in GY20 as compared to GY19 due to the adoption of virtual events and of some in-person events being held. In GY21, there is a dramatic decrease in the number of K-12 student and teacher participation. Many SVs reported that they have had difficulty in engaging with K-12 teachers due to their workloads. Teachers that are currently working in the classroom are overwhelmed and do not have the time to take on additional engagements. In future years, we will encourage SVs to begin working with the education departments within their universities to engage with pre-service teachers. It is our hope that we can begin to have more success in integrating Earth Observation into classrooms by working with teachers-in-training before they are developing lessons for their classroom.

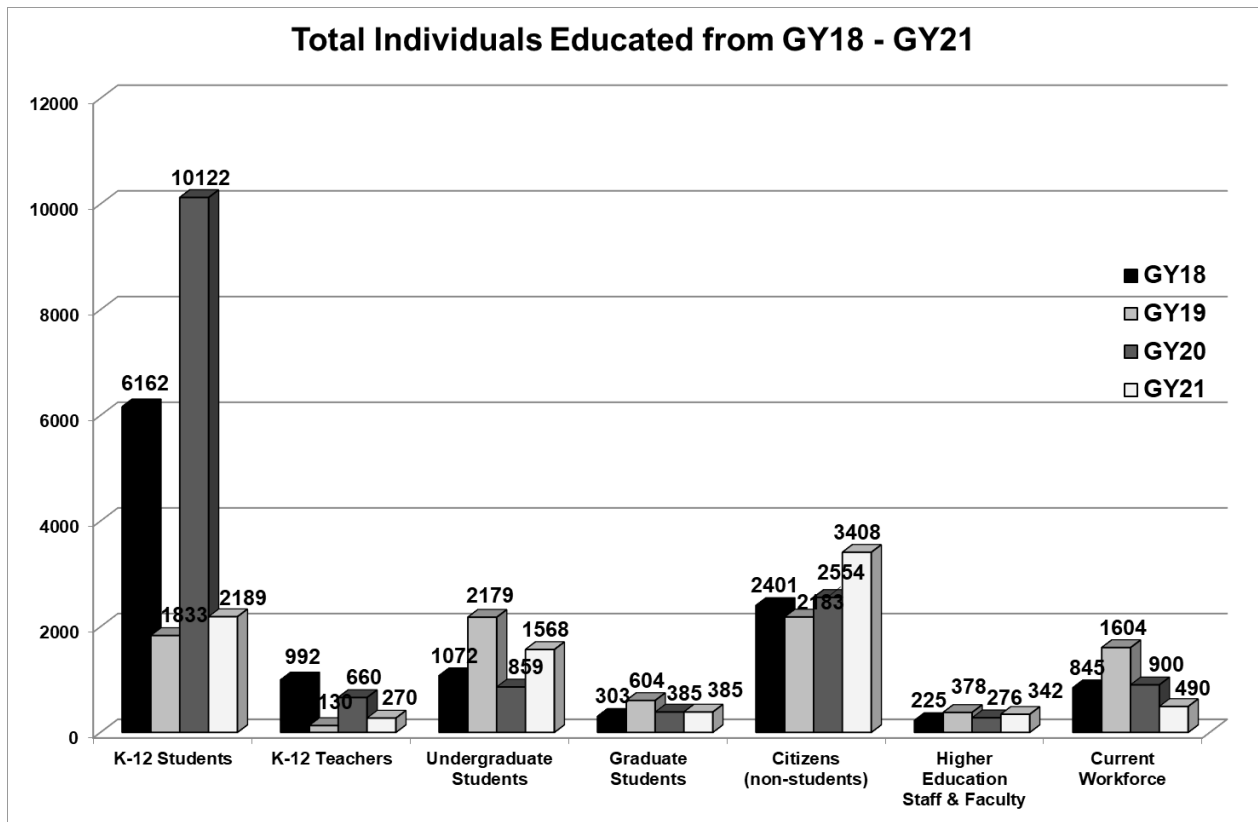


Figure 8. Numbers of the different categories of student and non-student participants in SV activities during GY18 - GY21.

2.1.5 Objective 5 - Support the U.S. Department of the Interior Secretarial Priorities

AmericaView National Activities Work Plan

Periods 1-5: The overall work plan, and ultimate objective for this proposal, is to build trust and to work within our local communities to encourage the use of remotely sensed data, technology, and to provide educational opportunities to support the core ideals of active conservation and management of our lands and waters. Through these efforts, AV will help to restore and maintain trust within the local communities, improving communication between the local and federal levels with many technology transfer efforts and frequent outreach involvement. These efforts will support both the current workforce and the next generation of community and business leaders, scientists, and educators.

The fundamental mission of AmericaView is suited to achieve many of the DOI Secretarial Priorities, even through the transition of Administrations. During GY21, AV helped continue to build and maintain trust within local communities in each of our member states. Below are selected projects that worked with low-income and under-represented communities, supported Native American University students, and developed tools to assist land managers to better respond to climate-related disasters.

- New MexicoView partnered with TRIO-Upward Bound, an organization that works with high school students to better prepare them for college, to bring 36 low income students to New Mexico State University for one week. These students participated in citizen science

observations, pacing and tree measurements, geo-inquiries, and various other STEAM related modules.

- South DakotaView hosted a South Dakota as Art workshop for American Indian students. The workshop was held at the American Indian Science & Engineering Society 2022 AISES Region 5 Conference.
- WisconsinView has developed the RealEarth satellite imagery visualization tool that is helping land managers to better respond to climatic impacts. Much of the imagery in RealEarth is acquired and displayed in near real-time, making it useful for event-based monitoring of severe weather events and natural hazards like wildland fires and flooding.

2.2 STATEVIEW KEY SUCCESS STORIES

During grant year 2021, AmericaView SV's worked with industry, local and state governments and communities, K-12 students and teachers, undergraduate students, and graduate students. Collectively, they have met all of five NLRSEORA objectives and have successfully carried the DOI message from the national to the local level.

AmericaView Benefits Local Decision Makers

NLRSEORA Objectives Fulfilled:

Objective 2 - Establish Strategic Partnerships

Objective 4 - Advance Education and Training, Technology Transfer, and Outreach

Objective 5 - Support the U.S. Department of the Interior Secretarial Priorities

Part of VermontView's program is to work with their local 4-H group. In GY21, they worked with The University of Vermont Extension 4-H program to hold training events on using drones and to teach them about remote sensing. The comment below is from Lauren Traister, the 4-H Teen and Leadership Coordinator.

"I am grateful to your team for conducting Earth Observation Day activities with our 4-H educators and students this past year. Your team's presentation and activities were fun and engaging and the teens indicated that they learned a lot about satellites and drones. Please pass along my thanks to the AmericaView program for providing the funding that made this event possible."

GeorgiaView's work on their land cover map atlas series for counties, congressional districts, and regional commissions is continuing to benefit local governments and community planners. During this grant year, the GeorgiaView Landcover Image Atlas Volume IV was focused on rivers and imperviousness. It focuses on the change of imperviousness levels caused by human impacts. A total of 191 maps were designed using the boundaries of 159 counties, 14 U.S. congressional districts, and 12 regional commissions. The atlas used the imperviousness datasets from the U.S. Geological Survey, Landsat satellite imagery, and the Cropland Data Layer dataset from the U.S. Department of Agriculture. The atlas was delivered to 116 local and regional offices in Georgia including the Georgia governor's office, U.S. congressional offices, regional commissions, Georgia Department of Natural Resources, water authorities, and county public works. The atlas is freely available in the PDF eBook format at the GeorgiaView website, [website](#).

Glen Polk, Fire Chief of the Spalding County Fire Department and Director of the Spalding County Office of Homeland Security, gave the statement below about using the GAView atlases.

“This atlas provides a great resource and actually will assist us as we attempt to map our waterway locations and entrance points to assist us when we may be called for rescues on our waterways, not to mention the development applications that this resource provides. Thanks again and please let us know if there is anything that we can assist with.”

Undergraduate Student / Graduate Student / Workforce Development

NLRSEORA Objectives Fulfilled:

Objective 3 - Promote Undergraduate and Graduate Research and Employment Skills

Objective 4 - Advance Education and Training, Technology Transfer, and Outreach

Objective 5 - Support the U.S. Department of the Interior Secretarial Priorities

One of the components of the TexasView program is to provide scholarships for undergraduate and graduate student research throughout their partner institutions. The testimonial below is from Ronney Phillips, a Geography undergraduate from the University of North Texas.

“This research has paid dividends not just through its results, but in the opportunities for future research and my personal and professional growth. As I soon learned, air pollution is one of the greatest environmental risks to health according to the World Health Organization. However, air quality can greatly vary depending on location. In Denton County, Texas, only one regulatory air quality station monitors air quality for more than 900,000 residents. When I was chosen to work on this project by my advisor, Dr. Lu Liang, I confess I didn’t have any overwhelming interest in research, particularly that which involved air quality. Instead, my research interests involved using any possible opportunity to use Geographic Information Systems (GIS) as a research tool. When I was offered this opportunity, I was enthusiastic in the approach, but less concerned with the subject matter.

Working through this project completely changed my outlook on research in general and my views on air quality. Most of the research I see at the student level is mostly hypothetical and results based. Students often reach a conclusion at the end of their research, but nothing seems to happen from there. It is beneficial to a student, but the student often moves on, and the research is often left on its own.

This research is different. Dr. Liang’s proposal and our work is not only results based, but it is the foundation for future research by undergraduates and graduate school students. The groundwork we laid is just the launch point for many others. Future student researchers will be able to use our work as the foundation of their own projects. I am proud of the work we’ve done to reach our results, but to help other students along the way.

Personally, our project has raised my personal and professional credibility. Its completion has allowed me several presentation opportunities, including presenting for the Southwest Division of the American Association of Geographers’ 2020 convention. The project has received awards from UNT’s GIS Day (best project) and from the GIS Colorado’s student app competition (best app). The project was also chosen for presentation in the Urban and Regional Information Systems Association’s Student and Young Professional competition in late July with a potential opportunity to showcase our work at the association’s annual national conference in October.

Further, the experience has allowed me to raise my credibility with my fellow students and professors. Before I began this project, I was just another student enrolled in the geography program. I collaborated with other students on class projects, but these projects never seemed to go anywhere after the course was over. Being able to work with Dr. Liang's cohort as an undergraduate placed me at a different level among my students. My experience working in GIS and with air quality issues made me a credible source of information, and soon, other students came to me with their own ideas about getting involved in their own research and using GIS as a tool to help them. I feel lucky and privileged for the opportunity to work with others and help them achieve their personal goals. My credibility among professors regarding GIS knowledge is just as valuable. I have been privileged enough to provide valued input to other professors regarding the use of ArcGIS Pro and ArcGIS Online, and their trust has allowed me to host workshops to show other students how to use these platforms.

Finally, this project ignited a passion I didn't know existed. It taught me I can perform applied research that matters. Through it, I can conduct my own research independently to further my goal of completing a master's degree."

New HampshireView has a long-standing intern program through their Basic Applied Spatial Analysis Laboratory. Below is a testimonial from one of their interns during GY21, Isabelle Lopez.

"Thank you so much for providing me the opportunity to work in the Basic Applied Spatial Analysis lab (BASAL) during the fall of 2021 and spring of 2022 as an AmericaView (NHView) intern. By working alongside the graduate students and post-doc in your lab, I not only improved my remote sensing and geospatial analysis skills but learned valuable information that will serve me well in my career. Specifically, I have been able to learn more about the ability of unmanned aerial systems to detect and monitor grasslands and shrublands through research done to help with BASAL's literature review. I have also been able to watch and assist with unmanned aerial system flights.

This summer I plan to continue to work in the BASAL group as I have just received a UNH Summer Undergraduate Research Fellowship (SURF). I am excited about this new opportunity that would never have happened if not for my NHView internship experience. I am grateful to America View for providing the funding to allow me to have this internship. I cannot thank you enough for the opportunity to work with your talented staff over the past year, I appreciate it immensely."

2.3 BOARD AND MEMBERSHIP MEETINGS

AV board and membership meetings were conducted each month of the grant year. AV maintains excellent attendance at all its meetings by SV PIs, Co-Is, State Coordinators, consortium members, and government partners. Nearly 80% of SV members regularly attend the virtual monthly membership meetings conducted through a Zoom subscription. The meetings contained informational presentations from industry, government, and AmericaView SVs. Board members devoted more than 1,100 hours to provide program governance, administrative guidance, and financial due diligence. SV PIs volunteered, at national, regional, state, and local levels, to give presentations, lead panels, and provide advice; these were all well-received efforts that enhanced the effectiveness of the consortium.

2.4 COMMITTEES

AmericaView members contributed more than 1,094 hours to committees to strengthen national collaborative endeavors and to share remote sensing information and knowledge. Committees work to support both the AV national organization objectives as well as supporting individual SV requests.

2.4.1 Education and Outreach Committee

The Education and Outreach Committee has supported AV national and SV activities with a focus on the development of lesson plans, specialized educational resources (including educational posters), and other remote sensing education tools. The committee also worked to increase remote sensing awareness by developing and maintaining strategic relationships and materials and facilitating outreach activities at the national and SV levels. In GY21, a [StoryMap](#) was developed to highlight the education and outreach expertise within the AmericaView network. The committee was chaired by Dr. Thomas Mueller and vice-chaired by Dr. Aaron Maxwell during GY21.

2.4.1.1 Earth as Art

Period 2-5: As funding permits, the AV Earth as Art exhibit will be displayed at participating SVs and at AV annual WBM and FTM meetings.



Figure 9. The travelling Earth as Art exhibit at the Pecora 22 conference held in Denver, Colorado in October 2022. The exhibit was used as part of the NLI and AV sponsored STEM event for high school students at the American Indian Academy of Denver and Compass Academy.

The traveling Earth as Art (EAA) Gallery Exhibit continued to be an incredibly popular education and outreach tool during GY21. It was showcased in Denver, Colorado in October 2022 as part of the Pecora22 Conference and STEM event (Figure 9). TexasView continued to enhance their Texas as Art collection, expanding the number of prints and exhibitions. The exhibit is focused on 10 ecoregions of Texas defined

by Texas' Department of Parks and Wildlife, whose online resources support the exhibit. The exhibit highlights the applications of satellite imagery across a broad range of challenges that affect Texas' ecoregions. Focusing on Texas State parks "brings the challenges home" and makes the exhibit relevant for diverse venues. New artwork is developed for each new host institution, in partnership with local stakeholders. Local artists have been invited to co-exhibit to provide ground-based perspectives. Expansion of other SVs developing their own state-centric collections began during GY21. AlaskaView developed their first three art pieces for their new Alaska as Art program. Through the use of the art pieces, their goal is to increase awareness of satellite earth observation in education, research and societal well-being and of the climatic and geologic processes that continue to shape Alaska's dynamic landforms and the climate change effects.

Education and Outreach – Earth Observation Day

Periods 1-5: The AV Education Committee will continue to organize and celebrate Earth Observation Day. AV will continue its national participation in AGI Earth Science Week (which is held annually in October). This affiliation allowed AV to provide material to thousands of K-12 teachers across the country. AV will continue to collaborate with NASA and USGS in the development of materials for the ESW packets. These materials, which include posters with earth science images and games involving imagery, have appeared in classrooms across the nation. AV's website published ArcGIS and Google Earth-based lessons, as well as additional Earth imagery games and puzzles, will be updated and expanded to provide complementary materials for educators and students.

Through a dynamic partnership with USGS and NASA, AV has developed educational [Earth Observation Day \(EOD\) posters and activities](#). These posters are included in the AGI Earth Science Week Toolkit that is distributed to 10,000 educators annually. The 2022 Earth Observation Day poster focused on the sustainability of the Landsat mission and showcased unique changing landscapes around the world.

2.4.2 Strategic Partners Committee

Under the guidance of the AV Board of Directors, the AV Strategic Partnerships Committee (SPC) has worked to continue to refine the goals and objectives of the AmericaView vision and mission. In order to improve and further the mission of AV, the SPC has provided suggestions and guidance to the AV consortium regarding strengths, opportunities, and perceived challenges that may support or slow the AV mission to empower Earth observation education. In GY21, the committee was chaired by Roberta Lencowski until July 2022 when leadership passed to Dr. Ramesh Sivanpillai.

Period 1: The SPWG and Education Committee will develop a working partnership with the National Science Teachers Association (NSTA), capitalizing on the Association's nationwide network of state-based chapters that strive to promote excellence and innovation in science teaching and learning.

Progress towards this goal were hampered due to the inability to travel during the COVID-19 pandemic. As those restrictions have eased over the last year, plans are underway for the AV ED and PD to attend the NSTA national conference that is being held in Kansas City, Missouri from October 25-28, 2023.

Metrics Assessment of Progress

Periods 1-5: To be a member of AV, a SV must have a state consortium that may include a "strategic partner." SV period reporting will include listing of their partners. Metrics may include the following: frequency of interactions between the partner and the nature of their work; the outcomes or opportunities of the partnership to the SV, AV, NLI, USGS, and DOI; and (if applicable) how many learners including traditional and non-traditional students, veterans, or working professionals were supported. AV will summarize this information to USGS/NLI in each period's Technical Report.

Figures 3 and 4 show the total consortium members for each SV in GY21, with the latter distinguishing between federal, state, university, and private members. Many of these SVs formed strategic partnerships at the state level. These partnerships will be further developed at the national level, expanding the effectiveness of the partnership and addressing the goals of NLRSEORA.

2.4.3 Earth Sensors and Research Committee

Period 2-5: The SBSWG (now the ESRC) and AV staff will review the results of information and data collection and reporting efforts in Period 1 and will be responsible for revising the data collection and workshop procedures each year, as appropriate. Needs and requirements workshops will be conducted

in each of Period 2-5. The SBSWG will be responsible for collecting and disseminating recent developments of each state consortium and incorporation into future lesson plans and research. All information will be shared with USGS staff.

In GY21, AV staff worked with USGS to develop topics that they were interested in having as part of the information requirements effort. An initial brainstorming session took place at the AV annual meeting held in Fort Collins, Colorado in May 2022. This information was subsequently refined to develop a questionnaire that was distributed throughout the AV network and the results can be seen [here](#).

In GY21, the committee was chaired by Dr. Russell Congalton and vice-chaired by Dr. Joe Knight.

3 NLRSEORA GRANT YEAR 2021 – IN REVIEW

3.1 MISSION AND OBJECTIVES

AmericaView's mission as a nationwide, university-based, and state-implemented consortium is to advance the widespread use of remote sensing data and technology through education and outreach, workforce development, applied research, and technology transfer to the public and private sectors. Period 4 of AV's NLRSEORA grant was exceptional due to the dedication of each of the AmericaView members. AmericaView strives to empower Earth observation education through outreach, education, applied research, technology transfer, and workforce development – these activities have been successfully realized through the efforts of the AV network in GY21. The AV network was fully represented by a national audience who fully supported the United States Department of the Interior, the United States Geological Survey, and the National Land Imaging program. AV continues to meet and exceed the objectives of all of these partner organizations as the foundation to its own mission promoting the use of remotely sensed imagery and geospatial technology throughout the United States and beyond. The mission of AV is not simply providing resources, but to understand local data and operational needs and transmit that information back to the USGS in order to serve the nation.

Throughout GY21, AV met and addressed the following USGS objectives:

- Gathering nationwide remote sensing data and information requirements and conveying those needs to U.S. DOI and USGS
- Establishing strategic partnerships that further both the goals and mission of U.S. DOI, USGS, and AmericaView
- Promoting undergraduate and graduate research and honing employment skills required of by students, veterans, and others in the workforce seeking to build or retool their skill sets
- Advancing education and training, technology transfer and outreach in the areas of remote sensing, geospatial data, and spatial analysis
- Supporting the U.S. DOI Secretarial Priorities, focusing on education and development of relationships within the Bureaus, Services, and Offices that comprise the DOI and, externally, at state and local levels
- Promotion and facilitation of education, outreach, and a broader understanding of the use of remote sensing science and expertise across the nation, thereby facilitating the use of DOI USGS products, services, and knowhow

These objectives were successfully addressed through the power of the AV network as a nationwide, collaborative and collegial process spearheaded by a national Board of Directors, Staff, and 41 incredible SV members.

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4 FINANCIAL ASSESSMENT AND REPORT

4.1 GRANT YEAR 2021 BUDGET REVIEW

On 18 September 2021, AV was funded at the level of \$1,250,000 to support the DOI/USGS/NLI NLRSEORA year four (Grant Year 2021 or GY21) grant objectives. The period of performance was 18 September 2021 – 17 September 2022 with a no-cost extension (NCE) through 30 June 2023.

To support the stated goals and objectives of DOI, USGS, and NLI, AV expended \$896,545 (71.7 percent) of awarded funds on direct programmatic support; \$249,845 (20 percent) on contracted staff (Executive Director, Program Director, Fiscal Manager, Bookkeeper, and support staff); \$25,087 (2 percent) on contract services; \$6,306 (0.5 percent) on office expenses; \$41,729 (3.3 percent) on travel expenses; and \$30,488 (2.5 percent) in indirect expenses. The GY21 funds were judiciously expended to support the advancement of the DOI USGS NLI NLRSEORA grant activity that sustains and promotes Earth observation education throughout the United States of America and beyond.

An important component of the NLRSEORA grant activity, in support of DOI/USGS/NLI is to dedicate as much of the funding as possible to the program expenses through grants to the SVs and national program activities. Figure 10 compares total programmatic expenses vs what was proposed in the 5-year proposal from GY18-GY21. For each of the four years of the grant activity, AV has exceeded the amount allotted to the program than was originally budgeted.

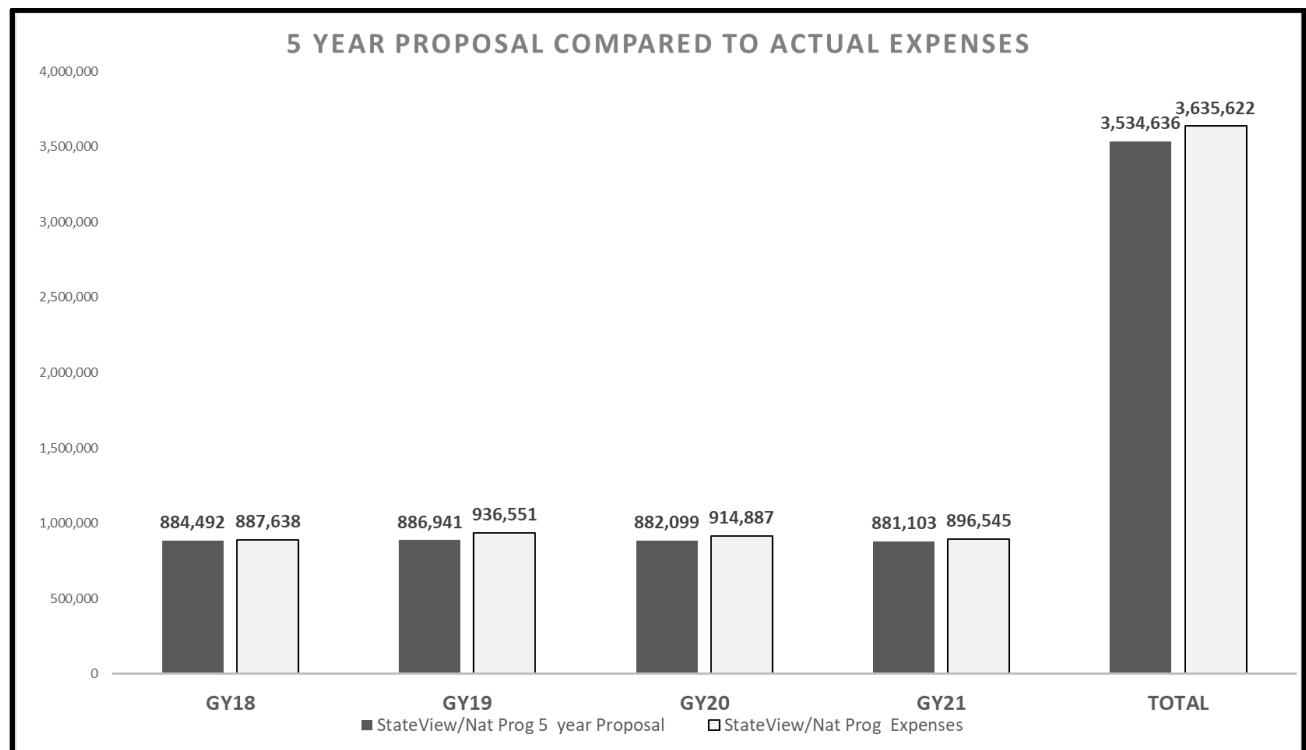


Figure 10. Actual programmatic expenses compared to proposed amounts in the NLRSEORA 5-year proposal for GY18-GY21.

The long-term vision is to grow AV to include all 50 states, Washington DC, and the territories. In the last three years, AV has admitted four new states as associate members. Associate Member do not receive full funding but may receive smaller amounts, if available, to begin building their SV program and for travel to the AV annual meeting. In order for AV to grow the reach of the grant activity, additional and stable base funding is required. Figure 11 shows the amount of funding that is dedicated to the SV grants and the national program from GY18-GY21. Funding to support additional SVs would need to come out of the National Program funds. The amount in this budget category fluctuates each year based on the needs of AV and DOI/USGS/NLI. Two anomalous years for the national program budget category were GY19 and GY20. These two grant years were during the height of the COVID-19 pandemic and due to this, funding that was originally dedicated for travel was reallocated into the national program category. Due to the slim margins and instability in the national program category, AV is unable to bring any of the associate members into full member status until additional and stable funding is achieved.

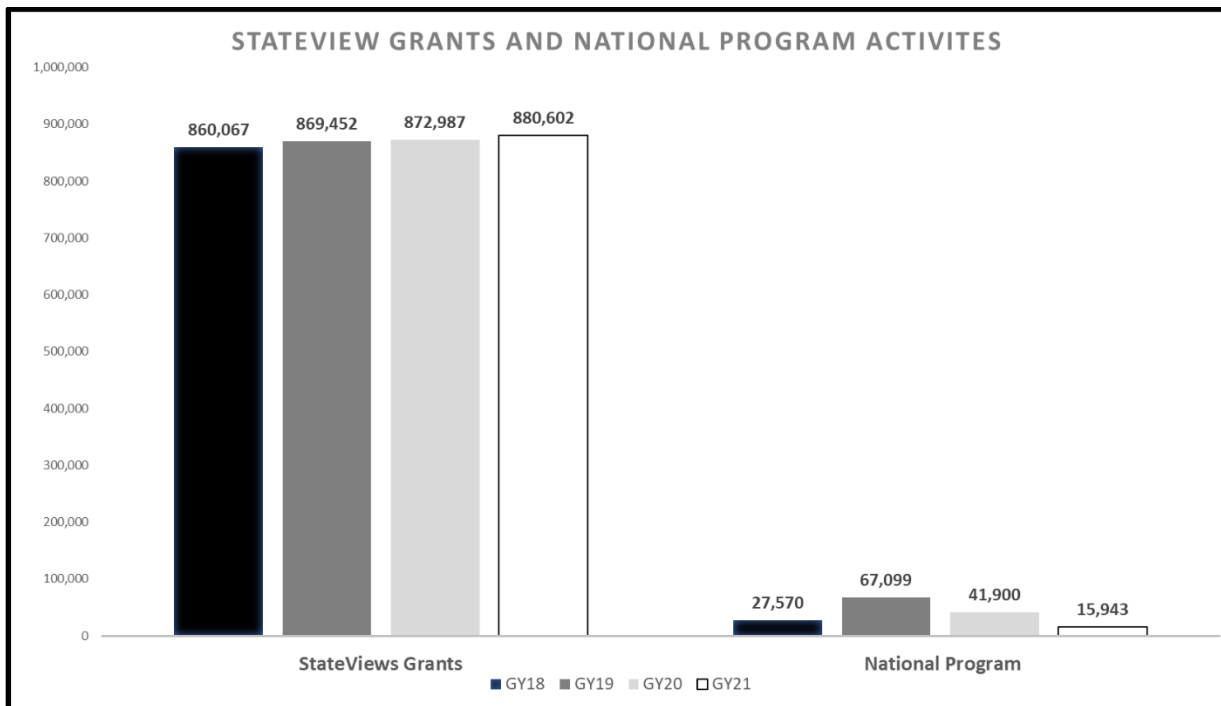


Figure 11. Actual funding amounts for SV grants and National Program Activities for GY18-GY21.

4.2 AMERICAVIEW FINANCIAL STATEMENT

AmericaView	
September 10, 2022 through April 18, 2023	
Year 4	
Grant Income	1,250,000
Expense	
Program	
Grants to StateViews	880,602
National Program	15,132
Total Program	895,735
Contract Services	
Audit	7,464
Accounting	5,382
Website Maintenance	12,241
Total Contract Services	25,087
Staff	
Executive Director	85,637
Program Director	81,373
Financial Manager	70,563
Bookkeeper	13,082
Total Staff	250,656
Office Expenses	
Postage and Shipping	485
Office Supplies	811
State Fees	110
Software	1,138
Liability Insurance	3,761
Total Office Expenses	6,306
Travel Expenses	
AV Conference Travel	16,213
AV Conference facilities and supplies	8,491
Other Meeting Travel	17,025
Total Travel Expenses	41,729
Total Direct Expense	1,219,512
Total Indirect Expense	30,488
Total Expense	1,250,000