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INTERNATIONAL DARK-SKY ASSOCIATION
MISSOURI CHAPTER

2021 Annual Report and 2022 Plan

On October 3, 2021, Stacy Park, located in the City of Olivette, received certification as an Urban Night Sky Place by the International Dark-Sky Association (IDA), the world's fourth UNSP.





International Dark-Sky Association

Missouri Chapter

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BOARD CHAIR, EXECUTIVE DIRECTOR MESSAGE

2021 was an exciting year for our Missouri Chapter. We continued to face the realities of the world under the pandemic but adapted to achieve our chapter goals for the year.

The four-month period from August through October was particularly fruitful. During this four-month period, our Chapter:

- Participated in a state-wide conference of Missouri cities, visiting with leaders of nearly forty cities.
- Expanded our volunteer network by designing and delivering a four-hour “Dark Sky Training” workshop with thirty-three applicants completing the training.
- Held our first chapter “Annual Conference” drawing over 100 participants from across Missouri.
- Released a virtual reality film about light pollution which debuted at the Gateway Arch National Park in St. Louis.
- Achieved our first designation under IDA’s International Dark Sky Place Program with the designation of Stacy Park in Olivette, Missouri as an “Urban Night Sky Place”.

Another bright spot was our growth of [Lights Out Heartland](#), a multi-state collaboration of partners whose goal is turn off lights during spring and fall bird migration. Sixteen organizations from Arkansas, Iowa, Kansas, Missouri, and Tennessee participate in the collaboration. The collaborations helped pass resolutions in St. Louis County and recruited several buildings to turn down/off lights during May/September periods of bird migration.

Traditional outreach was less productive in 2021 with per event attendance declining as people tire of “virtual” events which are, unfortunately, necessary during the pandemic.

On balance, our third full year of operation was a productive year with many “firsts” as you will read about in the following pages.

The attached report provides more details about 2021 and discusses our plans for 2022. Enjoy this report!

Please join us in our fight to reduce light pollution in Missouri. We need volunteers to meet with parks and communities, volunteers to help on committees, and donations to support our growing list of projects. To learn more, email us at info@darksnymissouri.org or call (636) 851-9630.



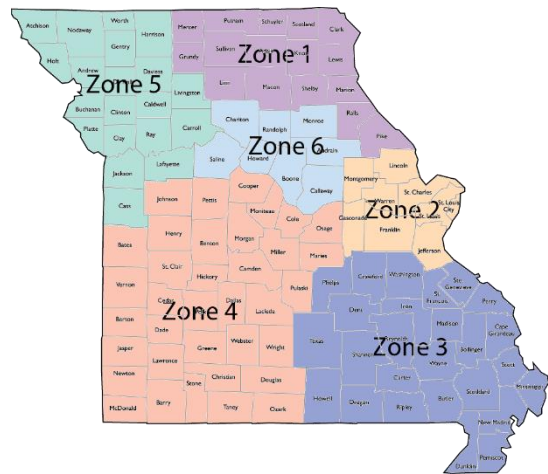
Don Ficken
Chapter Chair and Executive Director
Missouri Chapter

2021 ANNUAL REPORT

Executive Summary

The following pages outline our chapter's third full year of operation, recapping our 2021 programs, people, membership, marketing, and financial statements.

For the first time since our chapter was founded in late 2018, we have board members, volunteers, and assets in all six of our operating regions. We continue to expand our volunteer network across Missouri by partnering with conservation groups who have members willing to help.



There were many program “firsts” in 2021 as noted in Table 1 shown on the next page. The last half of 2021 was particularly active with several resource heavy events happening back-to-back during a four-month window. The coordinated strategy was designed to raise the visibility of our chapter with cities, expand our volunteer network, and generate positive change.

The designation of Stacy Park, located in Olivette, Missouri (metro north St. Louis) as an “Urban Night Sky Place” (UNSP) was an important milestone for our Missouri Chapter. Our state’s first International Dark Sky Place Program designation, and only the fourth UNSP designation in the world, was a result of more than one year’s work by dedicated volunteers. The designation fueled additional interest in the IDSP program, with three Missouri State Parks and several cities expressing interest to learn more. More interested is expected as we continue to talk with cities and parks about the IDSP program.

Many thanks to IDA for supporting us, and to our many volunteers, partners, and donors who made this year possible. Enjoy this report!

Please join us in our fight to reduce light pollution in Missouri. We need volunteers to champion our cause, workers to help with specific tasks, and funds to support our growing list of projects. To learn more, please email me at info@darksourcemissouri.org or call (636) 851-9630.



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TABLE 1 - IDA MISSOURI CHAPTER “FIRSTS” in 2021

- ✓ First chapter conference held in Springfield, Missouri, thanks to the support of Missouri State University in Springfield, Missouri. The conference featured 18 speakers and 16 exhibitors with more than 100 people participating.
- ✓ First participation in the “Missouri Municipal League” conference, a state-wide conference of cities that is held annually. Our chapter spoke directly with municipal leaders about IDA and responsible lighting practices. Our participation in the conference was funded by amateur astronomy clubs in Missouri, specifically the Astronomical Society of Eastern Missouri, the St. Louis Astronomical Society, and members of the Astronomical Society of Kansas City.
- ✓ First time to offer a “Dark Sky Training” workshop to volunteers across Missouri. In the four-hour workshop developed by our chapter, volunteers learned about the science of light pollution, the impact of light pollution on nature, and the International Dark Sky Places Program. More than thirty volunteers completed the workshop and received a certificate of completion.
- ✓ First time that we had board representation in every IDA Missouri operating zone within our state. Previously, not all zones were represented.
- ✓ First time that Missouri received a designation under the International Dark Sky Places program. Stacy Park in Olivette, Missouri, received certification as an Urban Night Sky Place, the fourth such designation in the world.
- ✓ First time that our chapter released a “virtual reality” film. We partnered with a filmmaker in Kansas City to produce and release on light pollution that featured the Gateway Arch. The film debuted at the Gateway Arch in September with plans to release the film for use by all National Parks.
- ✓ First time that brochures developed by our chapter are available at Missouri State parks. Our brochure on how to see the Milky Way in Missouri was distributed to ten Missouri State Parks.

Programs

IDA Missouri oversees a variety of programs designed to measure light pollution, raise public awareness, and promote positive change. Notable program activity in 2021 is highlighted below.

Outreach Programs

Outreach in 2021 continued to reflect the reality of pandemic with most events held virtually.

As shown in **Table 2**, our chapter participated in thirty-three events during 2021, just one less than the thirty-four events of 2020. Two-thirds of the events held in 2021 were virtual, the same as last year.

Although the number of events nearly matched the count of 2020, attendance was off sharply. A total of 1,500 people participated in our events held in 2021 compared to 6,500 in 2020. Virtual events drew smaller per event attendance in 2021 compared to 2020, reflecting, in part, the public's tiring of virtual events.

TABLE 2 – Outreach Programs								
Year	Number of Events				Estimated Attendance			
	In Person	Virtual	Hybrid	Total	In Person	Virtual	Hybrid	Total
2021	10	21	2	33	375	872	155	1502
2020	13	21	0	34	1679	4843	0	6522
2019	9	0	0	9	6610	0	0	6610

Refer to Exhibit G – 2021 Outreach Programs for a detailed listing of events supported in 2021.

Quality Measurement Program

IDA Missouri partners with Truman State University in Kirksville, Missouri, to place Sky Quality Meters ("SQMs") in parks, recreational areas, educational institutions, and municipalities. The SQMs are pointed to a fixed point in the sky with sky brightness measurements logged on a continuous basis for scientific analysis. Seventeen sites were active in 2021 with no sites added or removed during the year. Funding for purchase of the SQM's was provided by the NASA-

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Missouri Space Grant Consortium. **Figure 1** is a photo of an SQM installed at the Gateway Arch National Park in St. Louis.

Dr. Vayujeet Gokhale, Associate Professor of Physics at Truman State University in Kirksville, manages the overall sky quality measurement program. Students from Truman State University contribute to the program in many ways, including writing procedures for SQM operation, and developing graphs to plot data collected.

Beyond the scientific importance of the measurement data, the SQM program is an important tool to engage the community. Each measurement site must request the loan of the SQM from IDA Missouri and establish a plan to collect and report the data each month. Often, approvals must be obtained through official channels, raising the visibility of the IDA to community leaders.

Volunteers continued to collect data in 2021 but data analysis was not possible due to constraints of the pandemic.



Figure 1 – Photo of an SQM installed at the Gateway Arch National Park in St. Louis. Seventeen SQMs are installed across Missouri to continuously collect sky brightness data for analysis by Truman State University.

TABLE 3 – Sky Quality Meters by Zone	
Zone	Location
Zone 1 - Northeast Region	<ul style="list-style-type: none"> • Magruder Hall, Kirksville, MO • Truman State Observatory, Kirksville, MO • Missouri State Parks – Thousand Hills, Kirksville, MO
Zone 2 - St. Louis Region	<ul style="list-style-type: none"> • Brommelsiek Park, Defiance, MO • Gateway Arch, St. Louis, MO • Jefferson College, Hillsboro, MO • Stacy Park, Olivette, MO
Zone 3 - Southeast Region	<ul style="list-style-type: none"> • City of Perryville, MO • Mineral Area College, Park Hills, MO • S&T Astronomical Society, MO • SEMO, Cape Girardeau, MO • Grand Gulf State Park, Thayer, MO • Echo Bluff State Park, Eminence, MO
Zone 4 - Lakes Region	<ul style="list-style-type: none"> • City of Ozark, MO
Zone 5 - Kansas City Region	<ul style="list-style-type: none"> • ASKC, Kansas City, MO • ASKC, Lawson, MO
Zone 6 - Central Region	<ul style="list-style-type: none"> • Laws Observatory, Columbia, MO

Municipal Programs

The growth of light pollution in urban areas is a significant contributor to the increase of light pollution in Missouri. Our chapter encourages cities to enact ordinances or zoning codes that follow the **“Five Principles of Responsible Outdoor Lighting Principles”** as outlined in **Figure 2**. When requested, we provide “model” ordinances and access to lighting experts for technical questions.



Figure 2 – The Five Principles of Responsible Outdoor Lighting Practices developed by IDA and the Illuminating Engineering Society apply to all outdoor lighting.

Our chapter does not yet have an organized system to track lighting-related ordinances and resolutions of municipalities in Missouri. We are aware that St. Louis County and the City of Ellisville passed resolutions in 2021 and that the City of Ozark passed an ordinance. Other municipalities in Missouri may have lighting-related ordinances and resolutions in place, but we only learn of them through reports from volunteers.

Periodically, we get a request for assistance from local communities. In 2021, the Thomas Hart Benton Sierra Club in Kansas City learned that the Kansas City Public Works Department was planning to upgrade its streetlight infrastructure to LED technology. The city has a total of 98,000 streetlights, most of which are high pressure sodium. The Missouri Sierra Club provide feedback to the planning commission and requested help with technical lighting questions, which we provided. IDA members sent letters to the city council and updated local astronomy groups to encourage civic engagement. Details are not yet available, but it appears that the Kansas City Council has voted to replace 84,000 city streetlights with LED luminaires that are brighter and have higher color temperatures than recommended by IDA. On the positive side, the city has agreed to get public feedback on 3,000 Kelvin vs 4,000 Kelvin temperature lighting along 2-lane roads within the city, representing about 44,000 lights. The experience has underscored the challenges with getting responsible lighting policies implemented in cities, especially in large urban areas.

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International Dark-Sky Places Program

The International Dark-Sky Places Program (IDSP) was a priority for our chapter in 2021. The award-winning program was founded by IDA in 2001 to encourage communities, parks and protected areas around the world to preserve and protect dark sites through responsible lighting policies and public education.

IDA offers five IDSP designations as described on IDA's website at DarkSky.org:

1. International Dark Sky Reserves
2. International Dark Sky Sanctuaries
3. International Dark Sky Parks
4. International Dark Sky Communities
5. Urban Night Sky Places

Only the last three designations can be achieved in Missouri due to light pollution. A color-coded map showing the darkest areas of our state is provided in **Figure 3**. Quantitative information about Missouri's darkest skies is provided on our website at DarkSkyMissouri.org/DarkSkies.

The IDSP's "Dark Sky Parks" designation is achievable by parks in remote areas of Missouri. Parks located in the gray/purple areas of the color-coded map provided in **Figure 3** are prime candidates for the designation.

The IDSP's "Dark Sky Communities" and "Urban Night Sky Places" designations do not require a specific level of darkness making them more achievable in urban areas. Of these two designations, the "Urban Night Sky Place" (UNSP) is particularly attractive as its narrow focus is easier to achieve and the control of light pollution in parks is less controversial. A successful UNSP designation builds community support, creating a natural steppingstone to achieve the more ambitious "Dark Sky Community" designation.

Our chapter took several actions in 2021 to gain experience in achieving IDSP designations, to build a state-wide volunteer support network to engage parks and communities, to build relations with community leaders, and to provide discounted

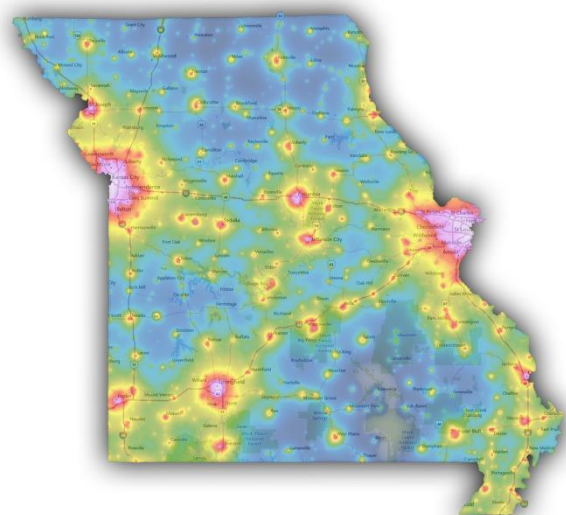


Figure 3 – This color-coded map of Missouri sourced from lightpollutionmap.info shows that Missouri still has a few dark areas left, as indicated by the gray areas on the map.

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resources for parks and communities wanting to pursue an IDSP designation. These actions included the following:

- **Dark Sky Training** – In August and September, we expanded our volunteer network by developing and delivering a four-hour training workshop focused on light pollution. Thirty-three members of conservation groups across Missouri, such as Missouri Master Naturalist, Missouri Sierra Club, and birder organizations, completed the two-part workshop.
- **Municipal League Conference** – On September 26-27 in St. Louis, Missouri, we hosted a booth at the Missouri Municipal League Conference and spoke directly with nearly 40 cities about light pollution and the availability of IDSP designations, particularly related to the Urban Night Sky Place. We were encouraged by our talks with community leaders.
- **Stacy Park UNSP Designation** – On October 3, our state was awarded its first designation under the IDSP program. Stacy Park, located in the City of Olivette, was designated by IDA as an “Urban Night Sky Place” ([Read the press release](#)). We gained valuable experience working with the City of Olivette to achieve this designation. The positive attention received by Stacy Park from its UNSP designation, including being featured on the cover page of *Missouri Parks & Recreation Magazine* (see [Figure 4](#)), has encouraged other communities to contact us.
- **Handheld SQM Discount Program** – On November 18, IDA Missouri approved a discount program arranged with Unihedron, the manufacturer of instruments to measure sky brightness, to sell handheld sky quality meters to parks and communities at a substantial discount.



Figure 4 – In one example of the positive publicity received by the designation of Stacy Park as Urban Night Sky Place, the park was featured on the cover page of *Missouri Parks & Recreation Magazine*.

Our top-down, bottom-up approach taken in 2021 was designed to get the attention of community leaders while building citizen support to encourage leaders to act. We see evidence this approach is working. Three Missouri State Parks and two community parks formally expressed interest in being designated under the IDSP program. Informal discussions are underway in other locations.

Our new SQM discount program appears to be working, too. Three parks have agreed to purchase handheld, sky quality meters under our purchase discount program.

We are encouraged by our progress and plan to make IDSP a continued priority for 2022.

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Lights Out Heartland

Missouri lies directly in the path of the Mississippi Flyway, one of the heaviest bird migration flyways in the world. Most birds fly at night, navigating using the Moon, Stars, and night sky. As they pass over big cities, birds can become disoriented by bright artificial lights and sky glow. An estimated 600 million birds in the U.S. die each year from exhaustion caused by light pollution and from collisions with buildings. [A study published by Cornell Lab of Ornithology](#) ranked St. Louis and Kansas City among the top ten deadliest cities for birds during migration.

In response to concerns about light pollution impacting birds, our chapter spearheads a collaboration of organizations called “[Lights Out Heartland](#)”. [Lights Out Heartland](#) seeks to reduce the impact of light pollution on migrating birds through responsible lighting practices, particularly in commercial buildings. As noted in **Table 4**, sixteen bird-friendly organizations in Missouri, Kansas, Iowa, Tennessee, and Arkansas participate in this growing collaboration.

Table 4 - Lights Out Heartland Partners

International Dark-Sky Association – Missouri Chapter (darksnymissouri.org)
Arkansas Natural Sky Association (darksnyarkansas.org)
Audubon Center at Riverlands (riverlands.audubon.org)
Burroughs Audubon Society of Kansas City (burroughs.org)
Columbia Audubon Society (columbia-audubon.org)
Gateway Arch National Park (nps.gov/jeff)
Greater Ozarks Audubon Society (greaterozarksaudubon.org)
Green Iowa AmeriCorps (greeniowaamericorps.org)
Johnson County Community College (jccc.edu)
Missouri Department of Conservation (mdc.mo.gov)
Missouri River Bird Observatory (mrbo.org)
Missouri Sierra Club (sierraclub.org/missouri)
Saint Louis Zoo (stlzoo.org)
St. Charles County Parks (sccmo.org/232/Parks-Recreation)
St. Louis Art Chamber of Commerce (stlouisartchamberofcommerce.org)
St. Louis Audubon Society (stlouisaudubon.org)
Wildlife Rescue Center (mowildlife.org)

In addition to raising public awareness about light pollution’s negative impact on birds, the collaboration recognizes commercial buildings that reduce/turn off lights during May and September of each year, among the busiest months for migrating birds.

The collaboration is supported by a website (lightsouthearthland.org) and Facebook page (facebook.com/LightsOutHeart). Virtual meetings are held every two months.

Missouri Dark Sky Destinations

Our Chapter developed a brochure (see **Figure 5**) to help the public find the Milky Way in Missouri. In 2021, Missouri State Parks, which is featured in the brochure, distributed the brochure to kiosks in ten Missouri State Park locations. Additional copies were printed by our chapter and distributed at public outreach events. The brochure can be downloaded at DarkSkyMissouri.org/MilkyWay

Citizen Science Program

IDA Missouri partners with SciStarter.org to offer a citizen science program to collect data on how light pollution impacts viewing the night sky and life on earth. Program details can be found at SciStarter.org/DarkSky.

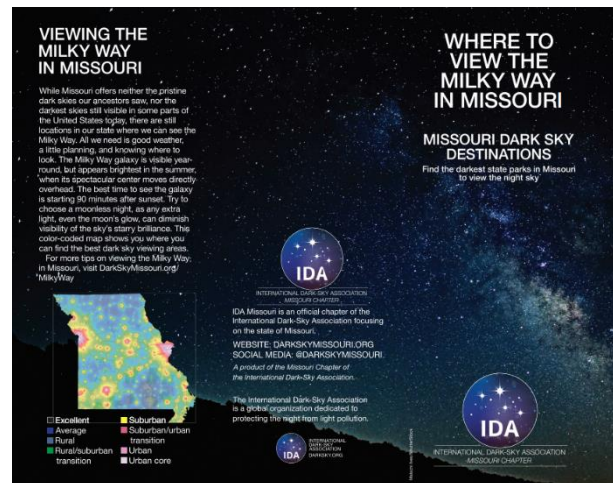


Figure 5 - This brochure created by a professional graphic designer, writing expert, and amateur astronomers guides the public on how to view the Milky Way in Missouri. The tri-fold brochure includes a color-coded map of Missouri areas to visually find areas with less light pollution.

Several public libraries and the Girl Scouts of Eastern Missouri enrolled in the program, purchasing citizen science kits in 2020. Rollout of the program was halted due to the pandemic. In the last half of 2021, participating organizations showed interest in restarting the rollout. However, continued issues with the pandemic makes timing of the rollout uncertain.

Student Program

IDA Missouri seeks to engage students and younger audiences to become advocates for reducing light pollution. Our chapter was active with student/educator groups in 2021:

- **Truman State University, Kirksville, MO** – Dr. Vayujeet Gokhale, Professor at Truman State University, has a regular, ongoing program to engage students to learn about light pollution and advocate change. In addition to their advocacy in Kirksville, students analyze, and chart sky quality brightness data collected from our state-wide SQM program.
- **Missouri State University, Springfield, MO** – Dr. Terrel Gallaway, Professor at Missouri State University, invited student participation in IDA Missouri's annual conference held in October 2021.
- **Southeast Missouri State University, Cape Girardeau, MO** – Dr. John Kraemer, Professor at Southeast Missouri State University, collaborated with Dr. Gokhale, Truman State

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University, on starting a student program on light pollution at Southeast Missouri State University. Documents were shared and ideas exchanged.

- **Rosati-Kain High School, St. Louis, MO** – Students at Rosati-Kain High School in St. Louis requested help from IDA Missouri on a project related to light pollution in Missouri. We responded to a series of questions they sent us.
- **Conservation Federation of Missouri** – College students from several universities in Missouri asked for help in drafting a resolution for submission to the Missouri Municipal League. The students serve on an “Environment and Ecology” committee with the *Conservation Federation of Missouri*. IDA Missouri members assembled a team and, with help of a volunteer lawyer from the [Great Rivers Environment Law Firm](#) in St. Louis, reviewed their resolution. The students finalized the resolution in November 2021.
- **Girl Scout Gold Award, St. Louis, MO** – A Girl Scout from Lindbergh High School in St. Louis requested help with a project on light pollution that would serve as the basis for obtaining a Girl Scout Award. We answered questions and provided contacts to assist the Girl Scout with her project.

Annual Conference

IDA Missouri held its first annual conference on Friday, October 3rd and Saturday, October 4th at Missouri State University in Springfield, Missouri. The title of the conference was “**Seeking the Dark: Nighttime Beauty, Biology, and Tourism**”.

Highlights of the 2021 conference are as follows:

- Both in-person and virtual participation in the conference was available at no cost.
- More than 100 people attended, equally split between virtual and in-person
- 18 speakers and 16 exhibitors participated
- Featured a keynote talk by Bettymaya Foott, Director of Engagement, IDA.
- Saturday, October 4th brought together a collection of speakers from conservation groups, educators, and government officials from across Missouri. Speaker topics included the science of light pollution, dark sky partners in conservation, nighttime recreation, the international dark sky places program, and ecotourism.
- The exhibitor displays were very popular with drawings and giveaways.

A post-conference survey gave high remarks for the facility, speakers, exhibitors, and an appreciation for offering a virtual option to participate. IDA Missouri has scheduled a conference for 2022 following the same format. The conference will be held at [Johnson County Community College](#) in Kansas City. Conference dates are Friday, September 30, 2022 (meet/greet), and all-day on Saturday, October 1, 2022. Learn more at DarkSkyMissouri.org/conference.

Virtual Reality Program

On September 22, 2021, IDA Missouri released a virtual reality film entitled *“Night Sky Heritage at the Gateway National Park”*.

The eight-minute, immersive experience provides a 360-degree panoramic view of the night sky above the grounds of the Gateway Arch National Park. The loss of our night sky heritage is illustrated in terms of the Bortle Scale, a nine-level numeric scale that provides a consistent standard for comparing skies with differing levels of light pollution. Viewers can seamlessly pan the night sky in all directions as if standing on the grounds of the Gateway Arch National Park.



Figure 6 - This eight-minute, immersive film about light pollution is expected to be made available on national basis by the National Park Service.

The film is a creation of Bentley Ousley, film maker, computer programmer, composer and musician from Kansas City, Missouri, and is narrated by Dr. Vayujeet Gokhale, Associate Professor of Physics, Truman State University in Kirksville, Missouri. Over the past decade, Ousley has worked extensively with immersive film and ambient music compositions, one of which earned him the Grand Prize in the Warner Brothers Pictures’ “Inspiring the Future” competition. Gokhale has spearheaded IDA Missouri’s program to measure sky brightness in Missouri.

The film debuted in September 2021 at the Gateway Arch National Park in St. Louis. Excited by the film, the National Park Service plans to make the film available to all national parks.

Figure 6 shows the start screen on YouTube which is publicly accessible at no cost.

To view the film, please visit DarkSkyMissouri.org/vrfilm.

People and Operations

The relatively large geographic size of Missouri creates challenges for the Chapter to represent the state as whole. In response, IDA Missouri has divided our state into six operating zones as noted in **Figure 6**. The zones allow more thoughtful recruiting of board members by region, building a volunteer network by region, and deploying resources such as Sky Quality Meters by region.

The table on the following page summarizes our people and assets by zone on December 31, 2021.

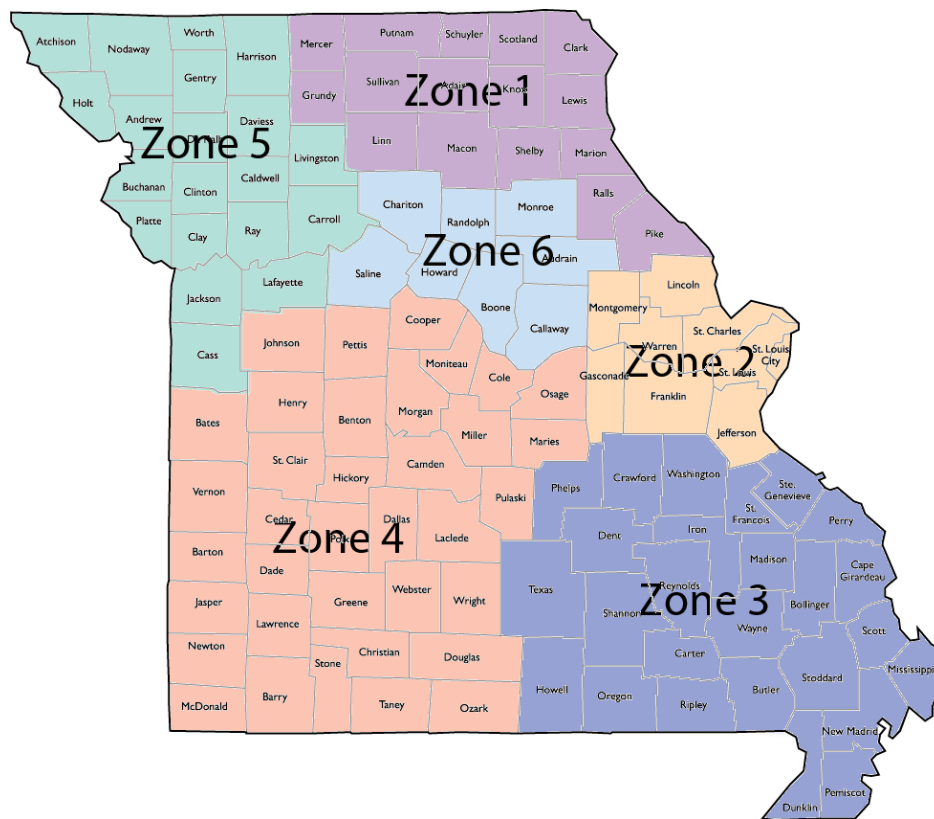


Figure 6 – The division of Missouri into six operating zones allows our chapter to more thoughtfully allocate or people and resources to ensure representation in all areas of our state.

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TABLE 5 - PEOPLE AND ASSETS BY ZONE

Zone	Board Members	Advisors	Sky Quality Meter
Zone 1 (Northeast Region)	<ul style="list-style-type: none"> • Vayujeet Gokhale, Ph.D. 	<ul style="list-style-type: none"> • Vayujeet Gokhale, Ph.D., Truman State University 	<ul style="list-style-type: none"> • Magruder Hall, Kirksville, MO • Truman State Observatory, Kirksville, MO • Missouri State Parks – Thousand Hills, Kirksville, MO
Zone 2 (St. Louis Region)	<ul style="list-style-type: none"> • Don Ficken • Cook Feldman • Bill Neubert • Brett Seymoure, Ph.D. • Chuck Simms 	<ul style="list-style-type: none"> • Dan Duffy, City of Ellisville • Trish Erzfeld, Perry County Heritage Tourism • Brett Seymoure, Ph.D., Washington University • Will Snyder, Saint Louis Science Center • Dan Zarlenga, Missouri Department of Conservation 	<ul style="list-style-type: none"> • Brommelsiek Park, Defiance, MO • Gateway Arch, St. Louis, MO • Jefferson College, Hillsboro, MO • Stacy Park, Olivette, MO
Zone 3 (Southeast Region)	<ul style="list-style-type: none"> • Matthew Kantola • Trish Erzfeld 	<ul style="list-style-type: none"> • Chad Follis, Ph.D. Mineral Area College 	<ul style="list-style-type: none"> • City of Perryville, MO • Mineral Area College, Park Hills, MO • S&T Astronomical Society, MO • SEMO, Cape Girardeau, MO • Grand Gulf State Park, Thayer, MO • Echo Bluff State Park, Eminence, MO
Zone 4 (Lakes Region)	<ul style="list-style-type: none"> • Loring Bullard • Terrel Gallaway, Ph.D. 	<ul style="list-style-type: none"> • Terrel Gallaway, Ph.D., Missouri State University • David Mitchell, Ph.D., Missouri State University 	<ul style="list-style-type: none"> • City of Ozark, MO
Zone 5 (Kansas City Region)	<ul style="list-style-type: none"> • Jackie Beucher • Rick Yord 	<ul style="list-style-type: none"> • Bentley Ousley, ASKC 	<ul style="list-style-type: none"> • ASKC, Kansas City, MO • ASKC, Lawson, MO
Zone 6 (Central Region)	<ul style="list-style-type: none"> • Melanie Knocke 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Laws Observatory, Columbia, MO

Board of Directors

IDA Missouri is governed by a Board of Directors. We ended 2021 with fourteen board members, a net increase of two board members over 2020.

Three board members were added during the year, namely Stephanie Todd from the Missouri Sierra Club, Loring Bullard from Greater Rivers Audubon Society in Springfield, and Melanie Knocke from Missouri Master Naturalist. Stephanie Todd was also elected as Treasure. Dan Duffy, Ellisville City Council, left the board due to time commitments. With these additions, all operating zones outlined by our Chapter are represented by a board member.

Our board is active, meeting at least six times each year, with board attendance averaging 85% during 2021. Guests are welcome at board meetings.

Board expertise includes behavioral ecology, economics, tourism, city operations, state parks and astronomy. The diverse experience and background of the board stimulates robust discussion.

Chapter Advisor Program

A “Chapter Advisor” program provides our chapter with access to “experts” from Missouri and to showcase our state-based talent. The role of Chapter Advisor is less demanding than joining our Board or volunteering for a committee. Fewer demands make it easier to recruit top talent with much needed expertise. In addition to providing a useful source of technical expertise, the program helps the chapter recruit new members and chapter leaders.

On December 31, 2021, IDA Missouri had the following Chapter Advisors:

1. Dan Duffy, City of Ellisville, City Council, Ellisville, MO
2. Trish Erzfeld, Perry County Heritage Tourism, Perryville, MO
3. Chad Follis, Ph.D., Mineral Area College, Professor Horticulture, Park Hills, MO
4. Terrel Gallaway, Ph.D., Missouri State University, Professor of Economics, Springfield, MO
5. Vayujeet Gokhale, Ph.D., Professor of Physics, Truman State University, Kirksville
6. David Mitchell, Ph.D., Professor of Economics, Missouri State University, Springfield, MO
7. John Kraemer, Ph.D., Professor/Director of Center for Environmental Science, Southeast Missouri State University
8. Bentley Ousley, Astronomical Society of Kansas City, Virtual Reality Filmmaker
9. Brett Seymoure, Ph.D., Behavioral Biologist, Washington University, St. Louis, MO
10. Will Snyder, James S. McDonnell Planetarium Manager, Saint Louis Science Center, St. Louis, MO

11. Dan Zarlenga, Missouri Department of Conservation, Metro Media Specialist – St. Louis Regional Office, St. Louis, MO

Chapter Committees

The Chapter maintains a variety of Standing and Ad-Hoc Committees to address chapter governance, operations, and program support. Specifics can be found in [Exhibit E – Chapter Standing Committees](#) and [Exhibit F – Chapter Ad-Hoc Committees](#).

Collaborations/Partnerships

Collaborating and building partnerships with other organizations can be an effective tool in accomplishing our goals of reducing light pollution in Missouri. By combining expertise and leveraging marketing efforts in a cohesive and coordinated plan, great things can be achieved with less effort.

In addition to the “[Lights Out Heartland](#)” and “[SciStarter](#)” collaborations discussed in the [Program Highlights](#) of this document, our chapter also partners with the following groups

- **Amateur Astronomy Clubs** – IDA Missouri is supported by amateur astronomy clubs in Missouri to include the [Kansas City Astronomical Society](#), the [St. Louis Astronomical Society](#), and the [Astronomical Society of Eastern Missouri](#) (St. Charles, MO). Amateur astronomy clubs funded IDA Missouri’s participation in the 2021 Missouri Municipal League Conference held in St. Louis. Participation in this state-wide conference of cities provided the opportunity for IDA Missouri to speak directly with city leaders. Amateur astronomy clubs also help raise awareness of IDA Missouri’s mission, help with volunteers, and assist with measurement sites in the SQM program.
- **Gateway Arch National Park in St. Louis** – IDA Missouri partners with the [Gateway Arch National Park](#) in St. Louis to deliver public programs during the year, providing important visibility of the chapter to a national audience. In September 2021, the Gateway Arch debuted the chapter’s virtual reality film to visitors and is coordinating rollout of the film to all national parks. In addition to raising public awareness, the Gateway Arch turns off lights on the Arch Grounds in May and September of each year to help protect birds during migration. The Gateway Arch also participates in IDA Missouri’s SQM program by taking daily measurements of sky brightness on the Arch grounds.

Membership

As noted in **Table 6 – Membership**, our chapter ended 2021 with 65 members, a gain of 17 members over 2020. The lack of in-person events created challenges for the chapter to add more members during the year.

TABLE 6 – Membership												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021												
Count	48	49	51	55	54	57	60	60	62	62	68	65
2020												
Count	42	41	42	44	45	42	43	38	40	43	45	48
2019												
Count	23	24	25	28	29	35	36	38	38	39	42	39
2018												
Count									10	20	19	22

Marketing and Communications

Email

Our chapter uses Mailchimp software for email communications to members and interested parties. Our email contact list grew to 149 contacts by year-end. Our goal is to produce and distribute a quarterly newsletter, but we have not had a volunteer to implement this idea.

Website

Our chapter supports a website located at DarkSkyMissouri.org. The website is rich in content and regularly updated. Events are displayed in an event calendar.

Media/Press

As noted in **Table 7 – Media/Press**, Media and Press attention showed modest improvement in 2021. Based on our tally, we had eight media/press events in 2021 compared to only two events in 2020.

TABLE 7 – Media/Press			
Date	Media	Reporter	Comments
2021			
4/1/2021	Gateway Gardner	Robert Weaver	Article on light pollution by Lynnda Greene
4/6/2021	St. Louis County Council	Various	Passed resolution encouraging Lights Out 4 Birds
4/8/2021	Daily Skimm	Skimm’rs	International Dark-Sky Week, Recognize Jackie B.
4/29/2021	NPR – St. Louis on the Air	Sarah Fenske	Lights Out Heartland/Jean Favara and Don Ficken
6/24/2021	KC Care Radio Interview	Ruth Baum Bigus	Interview with Jackie Beucher and Don Ficken
9/22/2021	Press Release	N/A	Announcing VR film featuring Gateway Arch
10/3/2021	Olivette Newsletter	N/A	Stacy Park official designation as UNSP
TOTAL MEDIA EVENTS = 7 events			
2020			
04/12/2020	St. Louis Post Dispatch	Jim Winnerman	Interview with Don Ficken on IDA Missouri
12/10/2020	St. Louis Post Dispatch	N/A	Lighting at Stacy Park in Olivette, MO under study
TOTAL MEDIA EVENTS = 2 events			



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Social Media

Our chapter has social media accounts on Facebook, Twitter, and Instagram under @DarkSkyMissouri. Chapter events are posted on Facebook “Events”.

Through partnerships with the Gateway Arch in St. Louis, amateur astronomy clubs, [Lights Out Heartland](#), public libraries and other organizations, we grew our [Facebook account](#) to nearly 800 followers at year end. Other social media accounts had modest growth.

IDA Missouri maintains a [YouTube](#) channel to post videos and training related to our outreach and educational programs. The YouTube channel can be accessed from the home page of our chapter’s website. We hope to grow this channel with more subscribers and content.

TABLE 8 – Social Media												
Media	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021												
Date	1/2		3/14		5/18		7/12		9/14		11/15	
Facebook	578		583		617		645		695		759	
Twitter	38		44		44		44		44		47	
Instagram	43		51		59		65		74		74	
YouTube	16		20		20		21		25		36	
Groups.IO	12		22		26		28		28		28	
2020												
Date	1/12		3/15		5/14		7/9		9/14		11/13	
Facebook	142		148		176		452		539		570	
Twitter	22		25		30		33		34		37	
Instagram	9		11		20		24		31		36	
YouTube	-		-		-		4		6		12	
Groups.IO	-		-		-		12		12		12	
2019												
Date			3/26			6/23			9/19		11/24	
Facebook			24			81			125		132	
Twitter			-			14			20		22	
Instagram			-			9			9		7	
YouTube			-			-			-		-	
Groups.IO												



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Financial Statements

Refer to Exhibit B – Financial Report for a financial report on 2021 and our plans for 2022.

2022 STRATEGIC PLAN

Executive Summary

2022 will follow a similar blueprint to 2021. We plan to continue with the same programs of 2021 making improvements based on feedback and our experiences.

We will focus on three areas:

1) Public awareness and education

We will continue our emphasis on raising public awareness on light pollution issues by supporting existing programs, namely:

- Annual conference
- Dark Sky Training
- Lights Out Heartland
- Virtual Reality
- Outreach
- Communications

2) Research and action

We will continue with our programs to measure light pollution in Missouri, continue supporting communities and parks wanting to adopt ordinances or resolutions, and continue allocating resources to help parks and communities achieve designations under the International Dark-Sky Places Program.

3) Strengthen core

We will continue to strengthen our core by ensuring that we have a strong board and volunteer base, resources to operate throughout Missouri, and a financial base to support our needs.

The next sections provide details about our plans to achieve each goal.

Programs

In 2022, we plan to focus our efforts on existing programs rather than launch new initiatives. Program priorities for 2022 include the following:

Outreach

We expect the first half of 2022 to continue facing challenges with the pandemic. Our outreach will be tailored to meet these challenges, with the goal of reaching 100 members by end of year.

Sky Quality Meter Program

Our sky quality measurement program has been an important program since our chapter started in 2018. We do not plan to add more sky quality meters to our existing program in 2022. Instead, we will shift our focus to:

- Publishing reports on data collected.
- Adding all-sky cameras to correlate weather and cloud impact on sky measurements.
- Relocating the SQM to a different part of the town/park to better sample the sky brightness in-and-around the city or park.
- Working with installation sites to develop and implement programs to reduce light pollution.

In addition to the fixed meters used at measurement sites, the sky quality meter program maintains a small inventory of handheld meters to measure sky brightness. Supplementing this inventory, several libraries in Missouri purchased handheld meters for use by library patrons in citizen science. We plan to encourage the use of handheld sky quality meters during public outreach programs and to collect and post scientific data to [Globe at Night](https://GlobeatNight.org), a global database of sky brightness measurements made available to scientists.

Lights Out Heartland

We plan to continue expanding our [Lights Out Heartland](#) collaboration, adding more organizations in Missouri and surrounding states. Leveraging this collaboration is a productive way to expand the visibility of our chapter in Missouri and nationally.

International Dark-Sky Places Program

We expect the International Dark Sky Places program to be a priority for our chapter in 2022. Several parks and communities in Missouri have expressed interest in pursuing a designation. During 2022, we plan to continue promoting IDSP with communities and parks, and further

strengthen our capability to support these applications through a state-wide network of volunteers. Details are as follows:

- **Dark Sky Training** – We received positive feedback from our four-hour, two-part workshop offered in 2021. Members of conservation groups across Missouri, such as Missouri Master Naturalist, Missouri Sierra Club, and birder organizations, participated in the training. Based on this success, we have scheduled another [Dark Sky Training workshop in March 2022](#). We are partnering with our conservation partners to promote the workshop and expect another great turnout.
- **Municipal League Conference** – We plan to participate in the Missouri Municipal League's [2022 conference](#) that will be held on September 11-14 at Margaritaville, Osage Beach in the Lake of the Ozarks. We were encouraged by our conversations with city leaders during the 2021 conference and want to continue building relationships with community leaders. We have asked for help from amateur astronomy clubs to fund to fund our exhibit, and this appears likely.
- **Handheld SQM Discount Program** – We plan to promote the chapter's handheld SQM discount program, thereby encouraging parks and communities to pursue designation under the International Dark Sky Places Program.

Annual Conference

We are planning another chapter conference in 2022. [Johnson County Community College](#) in Kansas City has agreed to host the event. Conference dates are Friday evening, September 30, 2022 (meet/greet), and all-day on Saturday, October 1, 2022. There will be no cost to attend the conference, with "in-person" or "virtual" attendance options available.

Our keynote speaker for the evening of Saturday, October 1, will be [Paul Bogard](#), author of popular books such as *The End of Night* and *Let There Be Light*. Funding for our keynote speaker is provided by our conference host, Johnson County Community College.

The conference schedule and registration details will be published on website: DarkSkyMissouri.org/conference.

Student Program

We plan to continue recruiting and engaging students in supporting IDA. We have an active program at Truman State University and the promise of several new student programs at other educational institutions across Missouri.



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Virtual Reality Program

We plan to work with the National Park Service to make our virtual reality film available to all National Parks. We are working with National Park Service to make alternative versions of the film to extend its use.

Citizen Science Program

Our citizen science program was derailed in 2021 due to the pandemic and might be derailed again in 2022. Once in-person activities resume, we plan to work with libraries and other organizations to reenergize our Dark Sky Citizen Science Program. This will primarily be done through outreach.

People and Operations

We will continue to strengthen our board and volunteer base, striving to find “champions” for every “zone” in Missouri and build more diversity in our chapter to include age, gender, color, and subject expertise.

Board of Directors

Our target range for the number of board members for IDA Missouri is twelve to eighteen. With fourteen board members in place, we will take a strategic approach to add more board members. Ideally, we want at least two board members in each region with more than two board members in regions containing large urban areas such as Kansas City. Also, we will seek opportunities to create a more diverse board (age, gender, race) and expand our expertise in ecosystems, human health, and lighting.

Chapter Advisor Program

We will continue to expand our list of “Chapter Advisors” with the goal of recruiting more talent for our chapter and developing champions across our operating zones.

Chapter Committees

We plan to continue expanding our base of chapter volunteers in 2022 to provide a more robust foundation for launching and completing projects.



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Collaborations/Partnerships

Collaborations and partnerships allow IDA Missouri to leverage our resources for greater results. IDA Missouri will actively support existing partnerships and seek new partnerships when opportunities are found.

Membership

We plan to continue growing our member base which ended 2021 at 65 members. We would like to reach 100 members by the end of 2022. Growth in membership will be achieved through recruitment by leaders, volunteers, members, and visibility in public outreach.

Marketing and Communications

We plan to communicate with our constituents through social media, email, and our website with the goal of building a relationship to inspire action.

Email, social media, Outreach Materials, Website

We will continue to improve our communications with members and the public, using our various communication methods including email, social media, and our website.

Media/Press

We had modest improvement in media/press during 2021 and hope to do better in 2022 as we grow and nurture our existing programs. Our annual conference offers potential for media coverage, especially in the Kansas City area.

Financial Plan

Refer to Exhibit B – Financial Report for a financial report on 2021 and our plans for 2022.



International Dark-Sky Association Missouri Chapter 2021 Annual Report and 2022 Plan

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EXHIBITS



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Exhibit A – Legal Entity

Current Chapter Structure

The International Dark-Sky Association – Missouri Chapter, LLC, (“IDA Missouri”) is a subsidiary of the International Dark-Sky Association, Inc. (“IDA”), an Arizona nonprofit corporation whose mission is to protect the night skies for present and future generations. IDA is tax exempt under Section 501(c)(3) of the Internal Revenue Code. IDA Missouri was officially incorporated in Missouri on October 15, 2018.

Changes to the IDA Chapter Program

Starting in January 2022, IDA is moving forward with a new chapter structure. In a letter dated 20, 2021, Ruskin Hartley, Executive Director of IDA stated:

“After a thoughtful review, the Board of Directors has decided to move away from the single-member LLC Chapter model towards a more equitable and accessible approach - especially to non-U.S. groups. Starting in January 2022, we will begin accepting applications under the new guidelines. Existing single-member LLC Chapters can maintain their current form for a period of up to three years. At that point, all Chapters will be transitioned to the new approach. LLC’s may incorporate as their own 501(c)(3), or they may transition to an all volunteer group.

The new approach makes it easier for IDA members to form all-volunteer Chapters. After submitting an application they enter into a simple two-page agreement. If they choose, Chapters can incorporate as a non-profit organization in their jurisdiction. This is outlined in more detail in the new Dark Sky Group handbook. It is attached for your reference.”

Early discussions with IDA suggest this will be a mostly “behind the scenes” change that will not disrupt operations, but just change our legal identity of IDA Missouri. The IDA Missouri Board has not yet met to discuss next steps. The Missouri Chapter is moving forward with 2022 as planned.

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Exhibit B – Financial Report

FINANCIAL REPORT				
Description	2019 Actual	2020 Actual	2021 Actual	2022 Budget
BALANCE SHEET				
ASSETS				
Cash in bank	\$896.73	\$985.21	\$2,072.62	\$2,037.62
Inventory - Sky Quality Meters	0.00	0.00	515.00	515.00
TOTAL ASSETS	\$896.73	\$985.21	\$2,587.62	\$2,552.62
LIABILITIES & EQUITY				
Liabilities	\$0.00	\$0.00	\$0.00	\$0.00
Equity	896.73	985.21	2,587.62	2,552.62
LIABILITIES & EQUITY	\$896.73	\$985.21	\$2,587.62	\$2,552.62
STATEMENT OF CASH FLOW				
CASH RECEIVED				
Donations – Organizations (Note 1)	\$940.00	\$340.00	\$850.00	\$1,400.00
Donations – Individual	940.00	75.00	2,273.53	600.00
Membership (Note 2)	0.00	0.00	0.00	0.00
Sales of Sky Quality Meters (Note 4)	0.00	0.00	0.00	515.00
TOTAL CASH RECEIVED	\$940.00	\$415.00	\$3,123.53	\$2,515.00
CASH OUTFLOW				
Municipal League Conference (Note 3)	\$0.00	\$0.00	\$1,250.00	\$1,300.00
Annual Conference (Note 1)	0.00	0.00	0.00	500.00
Sky Quality Meters (Note 4)	0.00	0.00	515.00	515.00
Signage, brochures, and handouts	0.00	275.49	208.86	200.00
Professional services – Brochure	0.00	50.00	0.00	0.00
PayPal Fees & Bank Charges	43.27	1.03	62.26	35.00
TOTAL CASH OUTFLOW	\$43.27	\$326.52	\$2,036.12	\$2,550.00
NET CASH INFLOW (OUTFLOW)	\$896.73	\$88.48	\$1,087.41	(\$35.00)
NOTES:				
(1) Donations - Organizations: 2021 excludes \$2,435.16 expenses paid directly by Missouri State University to support the Annual Conference. For 2022 budget, Johnson County Community College has agreed to cover most costs with the chapter budgeting \$500.00 for items not covered.				
(2) Membership Fees: Fees are paid directly to the parent corporation and not shared with the Chapter				
(3) Municipal League Conference: Includes \$950.00 booth registration fees and costs of handouts. The 2022 budget includes \$200.00 per diem to help volunteers pay for their overnight stay.				
(4) Sky Quality Meters: Meters are purchased at a discount and sold to parks and communities at cost.				

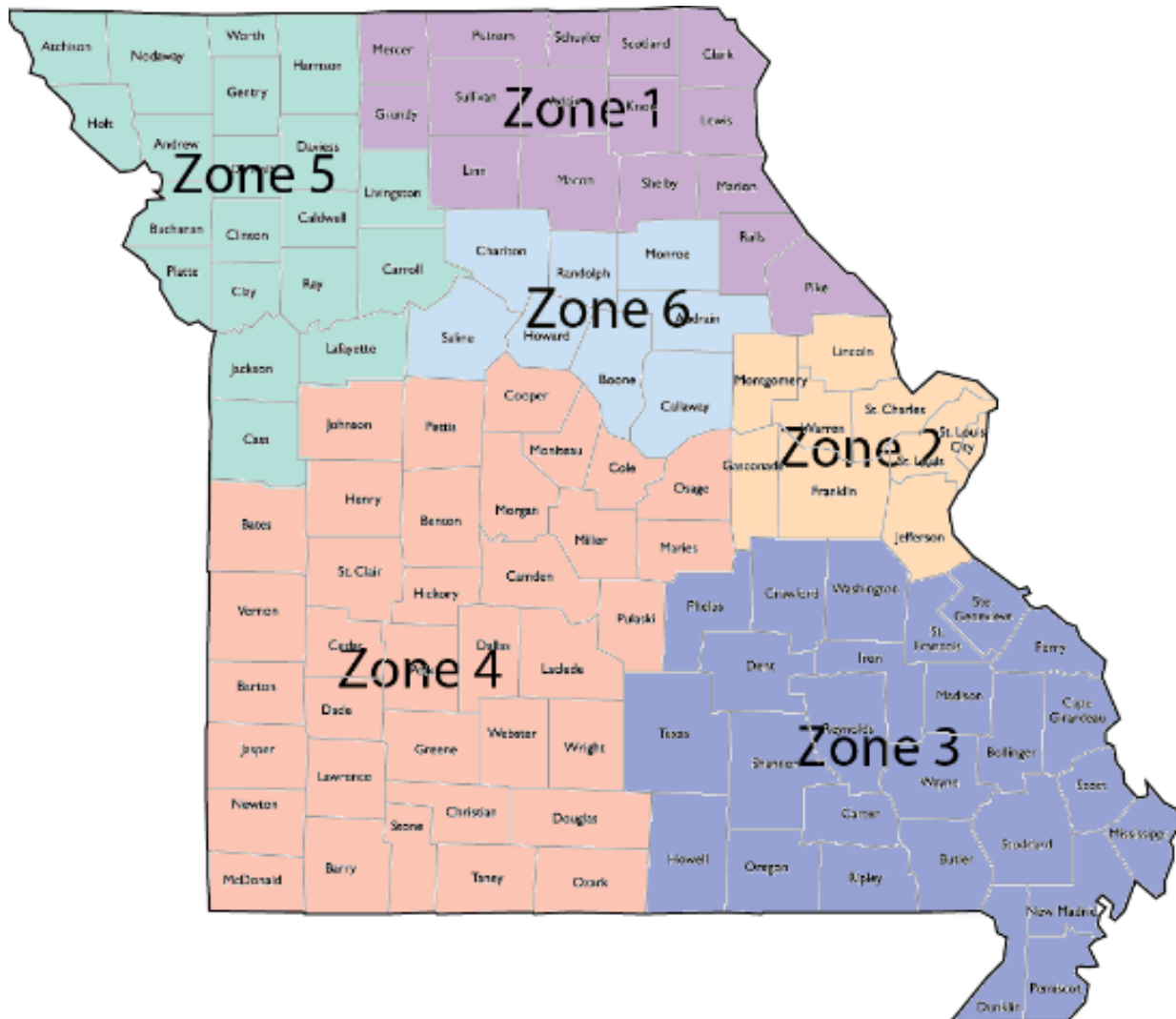
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Exhibit C – People and Assets by Zone



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PEOPLE AND ASSETS BY ZONE			
Zone	Board Members	Advisors	Sky Quality Meter
Zone 1 (Northeast Region)	<ul style="list-style-type: none"> Vayujeet Gokhale, Ph.D. 	<ul style="list-style-type: none"> Vayujeet Gokhale, Ph.D., Truman State University 	<ul style="list-style-type: none"> Magruder Hall, Kirksville, MO Truman State Observatory, Kirksville, MO Missouri State Parks – Thousand Hills, Kirksville, MO
Zone 2 (St. Louis Region)	<ul style="list-style-type: none"> Don Ficken Cook Feldman Bill Neubert Brett Seymoure, Ph.D. Chuck Simms Stephanie Todd 	<ul style="list-style-type: none"> Dan Duffy, City of Ellisville Trish Erzfeld, Perry County Heritage Tourism Brett Seymoure, Ph.D., Washington University Will Snyder, Saint Louis Science Center Dan Zarlenga, Missouri Department of Conservation 	<ul style="list-style-type: none"> Brommelsiek Park, Defiance, MO Gateway Arch, St. Louis, MO Jefferson College, Hillsboro, MO Stacy Park, Olivette, MO
Zone 3 (Southeast Region)	<ul style="list-style-type: none"> Matthew Kantola Trish Erzfeld 	<ul style="list-style-type: none"> Chad Folis, Ph.D. Mineral Area College 	<ul style="list-style-type: none"> City of Perryville, MO Mineral Area College, Park Hills, MO S&T Astronomical Society, MO SEMO, Cape Girardeau, MO Grand Gulf State Park, Thayer, MO Echo Bluff State Park, Eminence, MO
Zone 4 (Lakes Region)	<ul style="list-style-type: none"> Terrel Gallaway, Ph.D. Loring Bullard 	<ul style="list-style-type: none"> Terrel Gallaway, Ph.D., Missouri State University David Mitchell, Ph.D., Missouri State University 	<ul style="list-style-type: none"> City of Ozark, MO
Zone 5 (Kansas City Region)	<ul style="list-style-type: none"> Jackie Beucher Rick Yord 	<ul style="list-style-type: none"> Bentley Ousley, ASKC 	<ul style="list-style-type: none"> ASKC, Kansas City, MO ASKC, Lawson, MO
Zone 6 (Central Region)	<ul style="list-style-type: none"> Melanie Knocke 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Laws Observatory, Columbia, MO

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Exhibit D – Board of Directors

BOARD OF DIRECTORS TERMS AND ZONES (14 Board Members)

Class (Note 1)	Name	Zone	Vote	Term Start	Term End	Term (Note 2)
First Class	Don Ficken	2	9/24/2019	12/1/2019	11/30/2022	1
	Chuck Simms	2	9/24/2019	12/1/2019	11/30/2022	1
	Rick Yord	5	9/24/2019	12/1/2019	11/30/2022	1
	Terrel Gallaway, Ph.D.	4	11/25/2019	11/25/2019	11/30/2022	Partial
Second Class	Jackie Beucher	5	11/19/2020	12/1/2020	11/30/2023	1
	Bill Neubert	2	11/19/2020	12/1/2020	11/30/2023	1
	Trish Erzfeld	3	11/19/2020	12/1/2020	11/30/2023	1
Third Class	Cook Feldman	2	11/18/2021	12/1/2021	11/30/2024	2
	Vayujeet Gokhale, Ph.D.	1	11/18/2021	12/1/2021	11/30/2024	1
	Brett Seymoure, Ph.D.	2	11/18/2021	12/1/2021	11/30/2024	1
	Matthew Kantola	3	11/18/2021	12/1/2021	11/30/2024	1
	Stephanie Todd	2	11/18/2021	12/1/2021	11/30/2024	1
	Melanie Knocke	6	11/18/2021	12/1/2021	11/30/2024	1
	Loring Bullard	4	11/18/2021	12/1/2021	11/30/2024	1

OFFICERS (12/1/2021-11/30/2022)

Don Ficken, Chairman and Executive Director, Jackie Beucher, Vice President, Chuck Simms, Secretary, Stephanie Todd, Treasurer

NOTES :

Note 1: Board terms are divided into three classes which are staggered to expire in different years to help ensure continuity of the Board.

Note 2: Per our operating agreement with [International Dark Sky](http://InternationalDarkSky.org), IDA Missouri Board members serve for a term of three years and cannot serve for more than two (2) consecutive full year terms of office without a break in service of at least one (1) year.

The term count indicated in this column is the current “full term” number the board member is serving. Board members with a count of “1” only have one full term left. Board members with a count of “2” must take a break in service of at least one (1) year at term’s end. “Partial” means the member was elected to the board under for a partial term only under that class. Partial means the board member can still serve two full terms of service at term’s end before a break in service is required.

Exhibit E – Chapter Standing Committees

Standing committees handle issues that are considered timeless in nature.

- **Executive Committee** - Resolve issues needing immediate attention between board meetings, followed by reports to the full board for voting and decision-making.
- **Finance Committee** - Review and provide guidance for the organization's financial matters.
- **Board Nomination and Development Committee** - Develop board recruitment and retention plan.
- **Chapter Advisor Program** – Recruit and retain subject matter experts who can provide advice relevant to IDA-related matters.
- **Collaborations/Partnerships** - Develop working relationships with organizations to leverage chapter resources.
- **Fundraising Committee** - Raise funds to support chapter operations.
- **Membership Committee** - Monitor chapter membership; welcome new members; encourage members to get involved; periodically communicate with members via email.
- **Newsletter Committee** - Provide periodic newsletter to subscribers.
- **Outreach Committee** - Provide public talks and exhibitions to promote IDA.
- **Public Relations Committee** - Issue press releases; manage all printed publications, such as brochures, flyers, leaflets, and whitepapers; oversee website.
- **Social Media Committee** - Maintain social media presence.

Exhibit F – Chapter Ad-Hoc Committees

Ad-hoc committees have been formed to handle issues that are typically short-term and specialized in nature.

- **Annual Conference** – Plan and support an annual conference for IDA Missouri.
- **Citizen Science Program** - Promote Citizen science focused on light pollution.
- **Home Assessment Program** – Further develop and refine IDA’s “Dark Sky Friendly Home Lighting Program” which allows homeowners to self-certify that their home is dark sky friendly.
- **Lights Out Heartland** - Partnering with organizations across several states to raise awareness of how light pollution causes problems with bird migration.
- **Missouri Dark Sky Destinations** – Promote Missouri’s darkest skies through brochures and handouts. Partner with parks, tourism, and other organizations for distribution of the brochures and handouts to the public.
- **Missouri Dark Sky Photos** - Collect photos of Missouri night skies from different locations in Missouri to showcase what the public/tourists could see when touring Missouri.
- **Missouri Dark Sky Places Program** – Work with cities, parks, and other entities to achieve an official IDA Dark Sky status such as Urban Night Sky Designation. Includes working with cities to encourage adoption of ordinances to reduce light pollution.
- **Student Program** – Raise awareness of IDA with students and younger audiences and encourage their participation in IDA.
- **SQM/Sky Brightness Program** - Deploy SQMs throughout Missouri in both rural and urban areas. Assess light pollution trends and recommend corrective action.
- **Tourism Program** - Raise awareness of how dark skies can enhance tourism in Missouri; develop and implement tourism related programs.
- **Virtual Reality Program** - Create and promote a virtual reality film on the Bortle Scale and light pollution featuring the Gateway Arch in St. Louis in the background.

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Exhibit G – 2021 Outreach Programs

2021						
1/17/2021	Lights Out Heartland	Don Ficken	60m	20	A	W
2/23/2021	BirdSafeMO Webinar (MRBO; St. Louis Audubon Society)	Don Ficken	60m	54	A	W
2/23/2021	St. Louis Audubon Society and Webster Groves	Brett Seymoure	75m	75	A	W
3/18/2021	Lights Out Heartland	Don Ficken	60m	20	A	W
3/20/2021	St. Charles County Parks	Rachael Meara	60m	7	A	W
4/10/2021	Astronomical Society of Kansas City	Jackie Beucher	60m	50	A	W
4/17/2021	St. Charles County Parks	Rachael Meara	60m	5	A	IP
4/24/2021	Astronomical Society of Kansas City	Tim Hunter	60m	85	A	W
4/29/2021	Ozark Society - Schoolcraft Chapter	Don Ficken	60m	20	A	W
5/3/2021	St. Louis County Library - Lights Out Heartland	Don Ficken	60m	83	A	W
5/6/2021	Birds and Bees Festival (MRBO)	Don Ficken	30m	20	A	W
5/8/2021	Gateway Arch - Globe at Night	Connie Walker	60m	177	A	W
5/15/2021	St. Charles County Parks	Rachael Meara	60m	5	A	IP
5/20/2021	Lights Out Heartland	Don Ficken	60m	20	A	W
5/27/2021	Missouri Sierra Club - Lights Out Heartland	Stephanie Todd	10m	20	A	IP
6/5/2021	Powell Observatory in Kansas City	Jackie Beucher	60m	50	A	IP
7/6/2021	Missouri Sierra Club - Thomas Hart Benton Chapter	DeAnn Gregory/ Don Ficken	40m	30	A	W
7/8/2021	Missouri Master Naturalist - Lake Ozark Chapter	Don Ficken	60m	30	A	W
7/15/2021	Lights Out Heartland	Don Ficken	60m	20	A	W
8/10/2021	Stacy Park in Olivette - Parties in the Park	D. Ficken, S. Todd	180m	50	A	IP
8/19/2021	IDA Missouri Dark Sky Training Part 1	Vayu Gokhale	90m	33	A	W
9/14/2021	Missouri Master Naturalist - Chert Glades Chapter	Terrel Gallaway	60m	25	A	W
9/16/2021	Lights Out Heartland	Don Ficken	60m	20	A	W
9/16/2021	Parkview Horticultural Society	Lynnda Green	60m	25	A	IP
9/22/2021	IDA Missouri Dark Sky Training Part 2	Brett Seymoure	90m	33	A	W
9/18/2021	Gateway Arch - Lights Out Heartland	Don Ficken	60m	50	A	W
9/26/2021	Municipal League Conference	Team	2 days	100	A	IP
10/3/2021	IDA Missouri Annual Conference in Springfield - Kickoff	Team	120m	115	A	H
10/4/2021	IDA Missouri Annual Conference in Springfield - Full Day	Team	Full day	40	A	H
10/8/2021	The Meadow Campground	Vayu Gokhale	45	50	A	IP
11/15/2021	Presentation to César Vallejo University in Peru	Terrel Gallaway	60m	100	A	W
11/9/2021	Explorer Scientific - First Light Chronicles	Don Ficken	45m	50	A	W
11/18/2021	Lights Out Heartland	Don Ficken	60m	20	A	W
TOTAL EVENTS (Estimated, excludes cancelled events)		33	events	1502	attendees	