

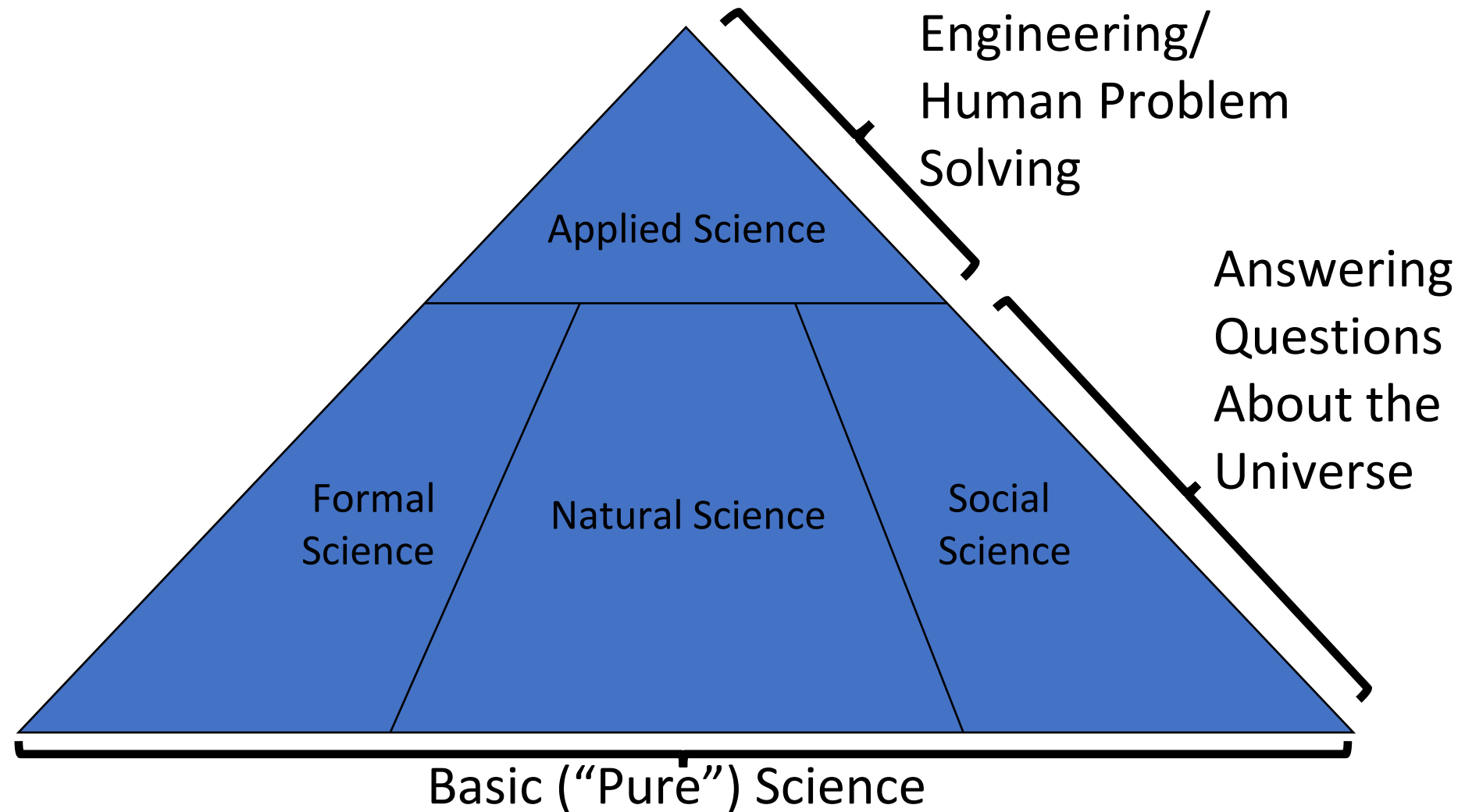


U.S. Department of the Interior
Bureau of Land Management

Grand Staircase-Escalante N.M.: Science in a BLM “Outdoor Laboratory”

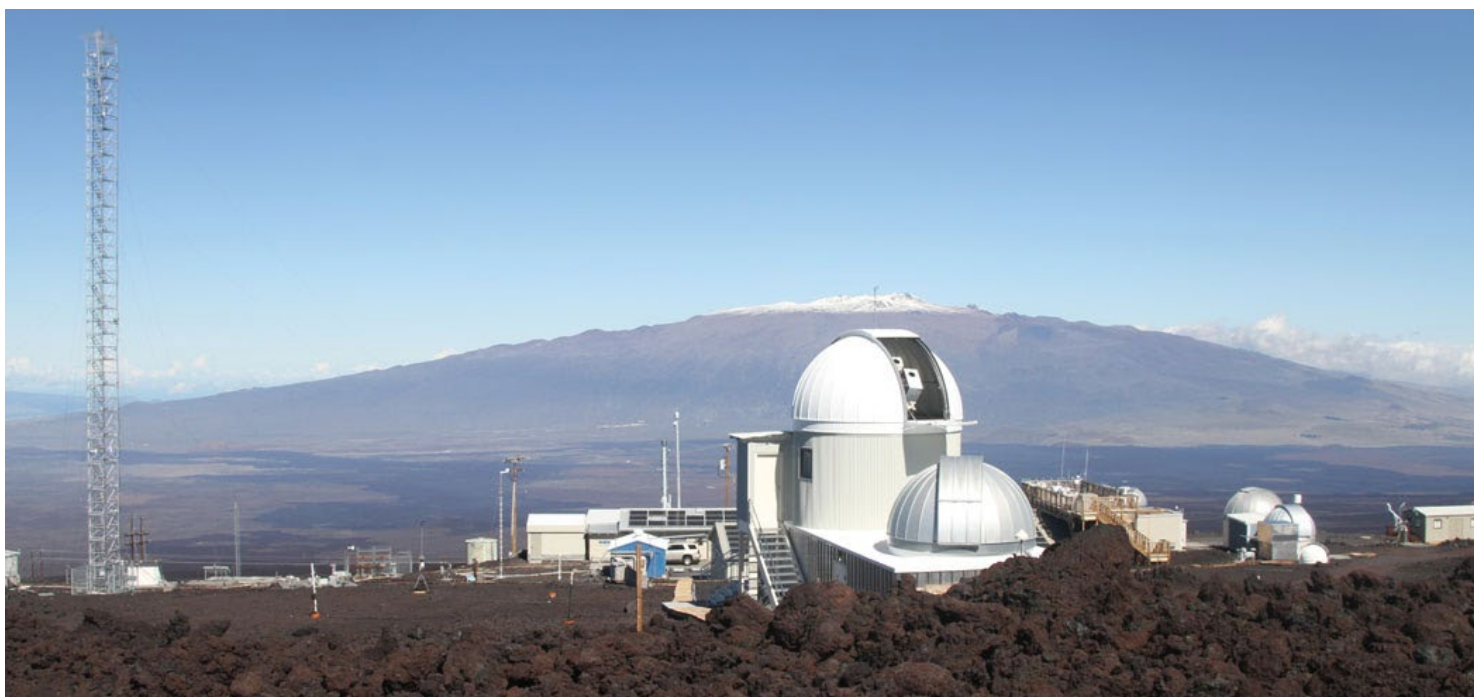
Alan L. Titus PhD
Paria River District
Paleontologist

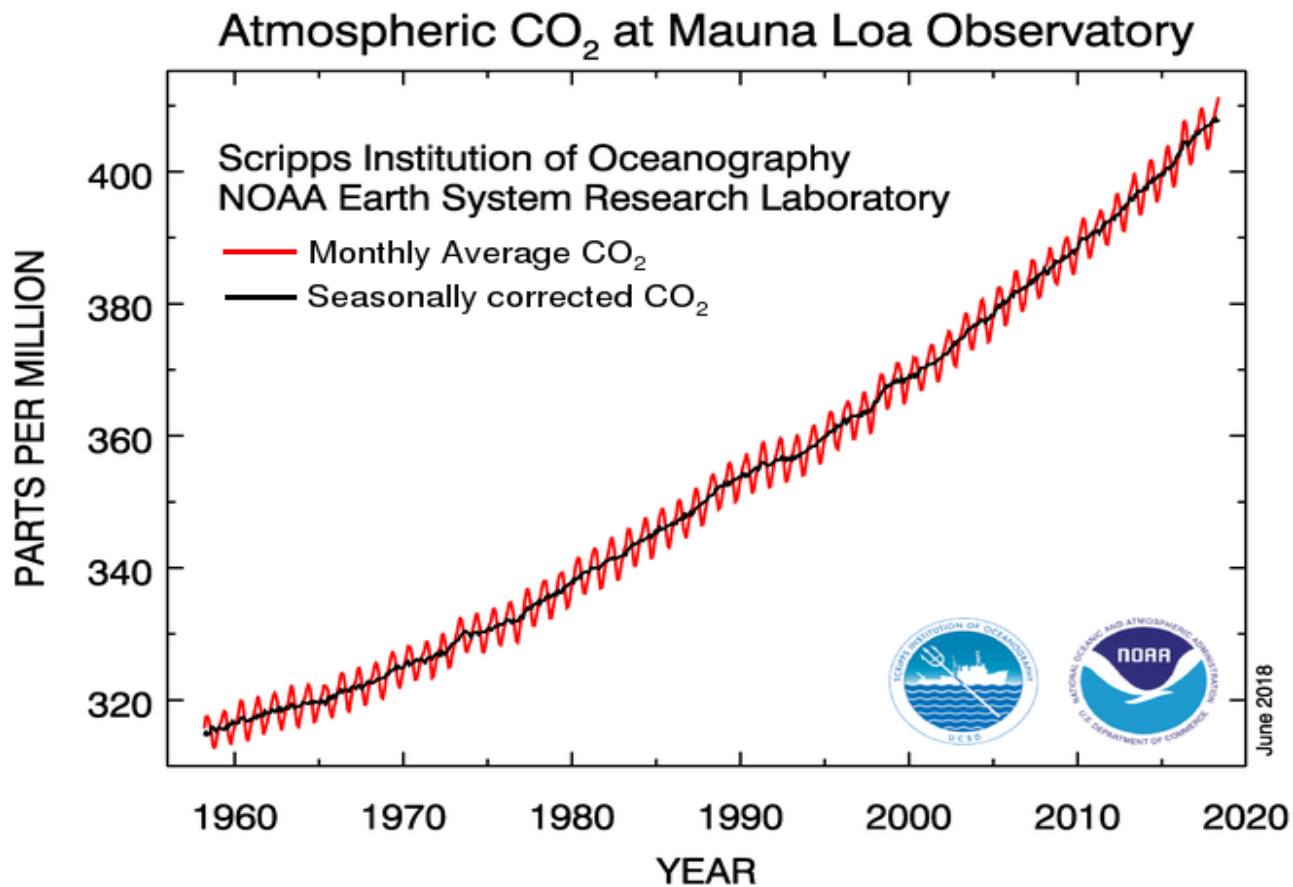


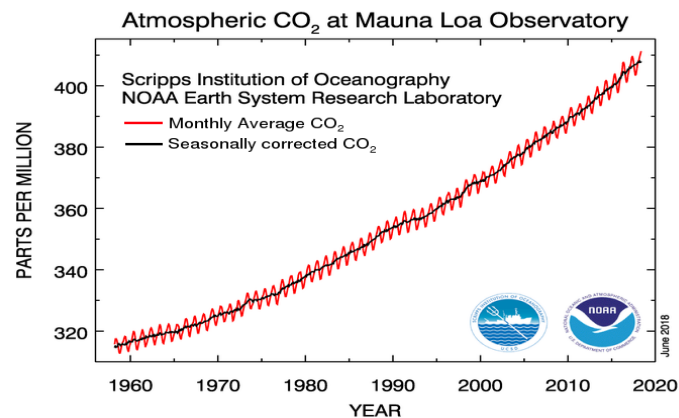
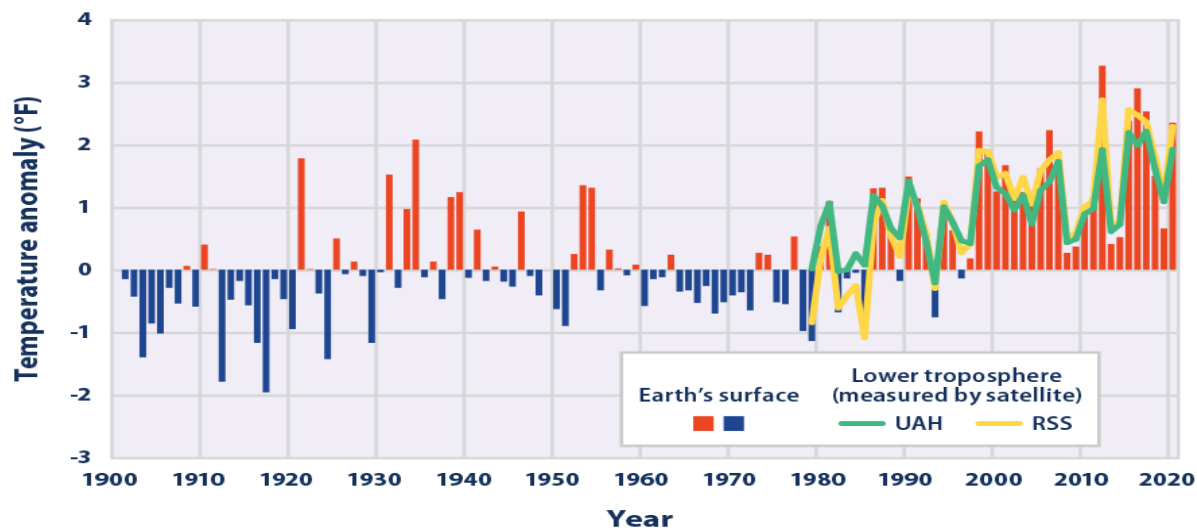




“Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe.”-Wikipedia









Benefits of Science

- Informed decisions based on rational arguments
- Maximize desired outcomes
- Foster understanding/appreciation of how the natural world works
- Inspire future generations
- Improve human experience/quality of life
- Understanding origins/place in the world
- Spinoff benefits to the arts and humanities (e.g. Jurassic World)
- Synergistic effect toward future science



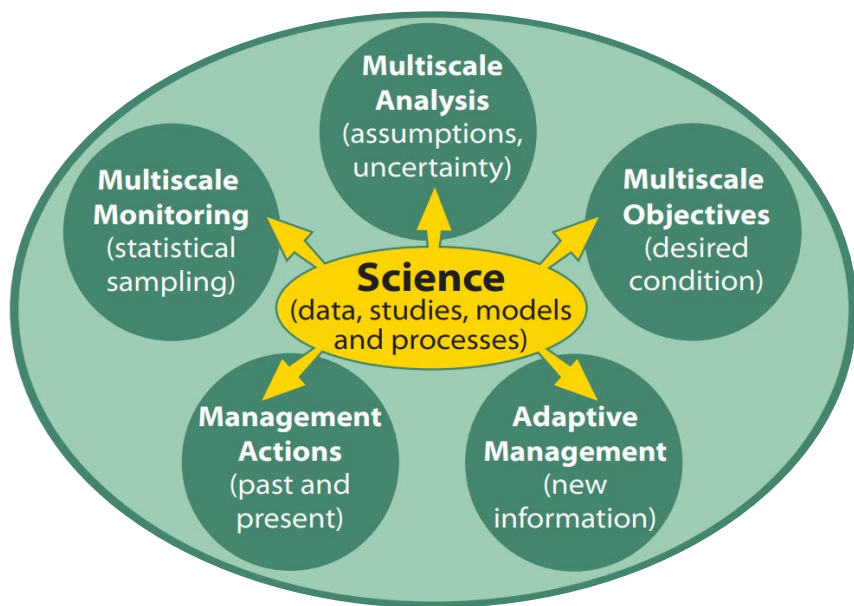
Science does not make decisions or mandate solutions to problems, which are based on human values... it only observes, models, and informs.

- Should be unfettered by political, financial, or ideological constraints.





BLM SCIENCE POLICY

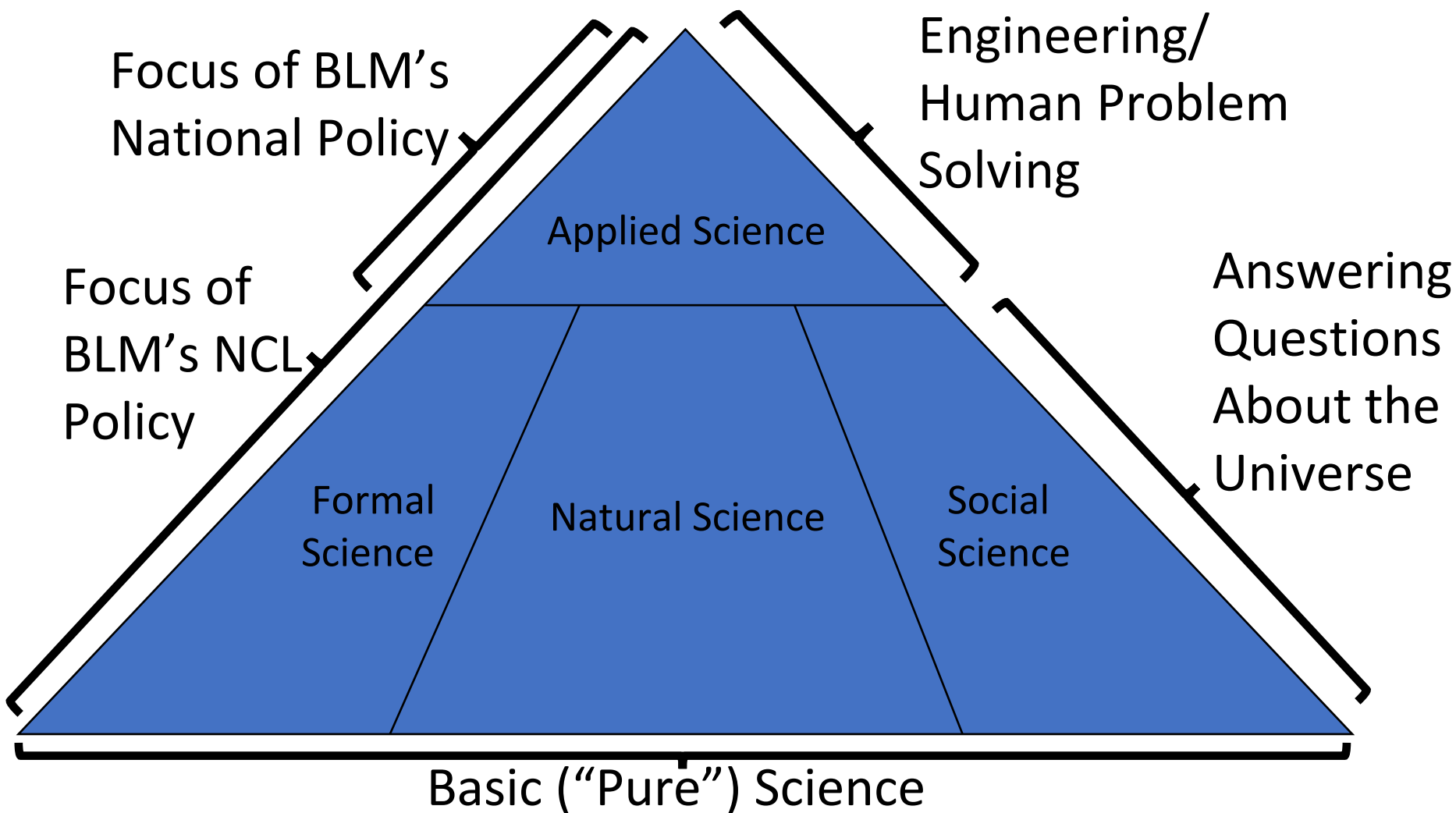


VS.

“1) scientific investigation of natural, social, and cultural resources referred to in each unit’s enabling language”

-Advancing Science in the BLM:
An Implementation Strategy,
2015

-NLCS Science Strategy, 2007





“The NLCS (=NCL) science strategy responds to the legal mandate in the enabling legislation and proclamations to promote and foster **both basic and applied science** by presenting a plan to facilitate scientific understanding of the BLM’s NLCS units.”

-NLCS Science Strategy, 2007



Pros/Cons of Basic Science

- Pros
- Synergistic partnerships with other research institutions
 - Basis for most public interpretation of natural resources
 - Excellent source of positive PR.
 - Many researchers come with outside support

- Cons
- Hard to prioritize “it’s *all* important!”
 - More esoteric work is easy target for critics “what’s the point?”



Pros/Cons of Applied Science

- Pros
- Can be useful for decision makers immediate needs
 - Easy to prioritize, based on issues
 - Easy to “sell” to management
 - Easy to define the scope of research

- Cons
- Generally done on a pay to play basis with contractors
 - Can feel like wasted effort if decisions made politically



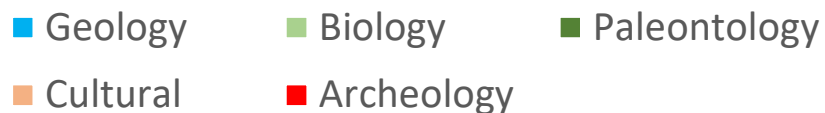
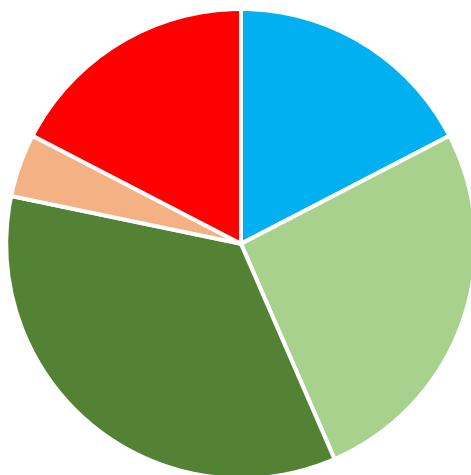
GSENM's OUTDOOR LABORATORY

- **“It also serves as an outdoor laboratory on the frontier of scientific research that continues to regularly reveal important insights into our planet and our past.” Proclamation 10286**
- 260-million-year sedimentary bedrock record with especially rich and significant Cretaceous strata/fossils.
- Located within the Colorado Plateau Ecoregion
- Vast expanse of land covering five major vegetation zones, and over 260 soil types
 - encompasses most found on the Colorado Plateau
- Diverse flora/fauna (especially insects)
- Minimum of 12,000 years of documented human history

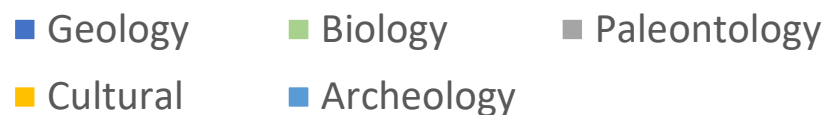
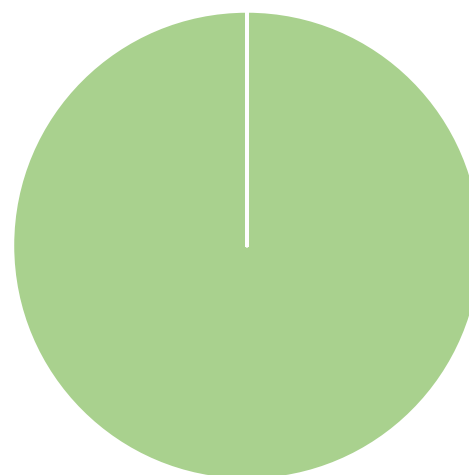


SCIENCE IN GSENM-2002

BASIC N=24



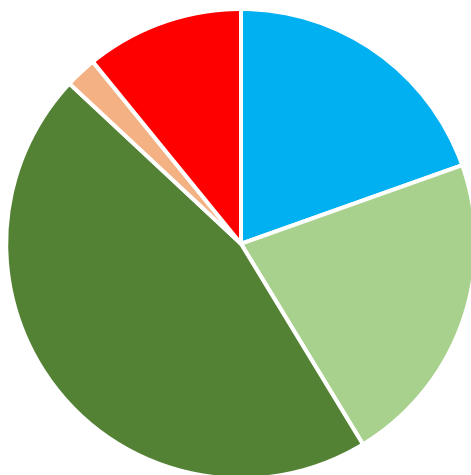
APPLIED N=3





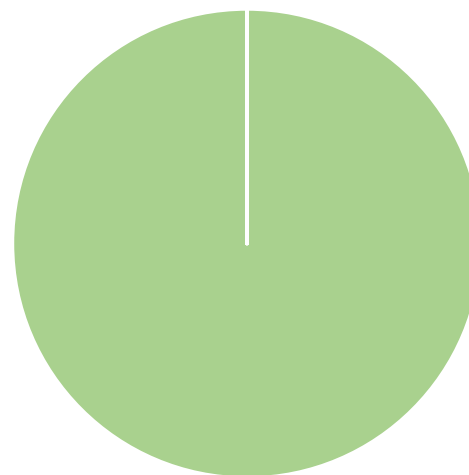
SCIENCE IN GSENM-2019

BASIC N=45



■ Geology ■ Biology ■ Paleontology
■ Cultural ■ Archeology

APPLIED N=3



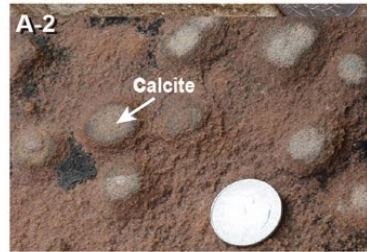
■ Geology ■ Biology ■ Paleontology
■ Cultural ■ Archeology



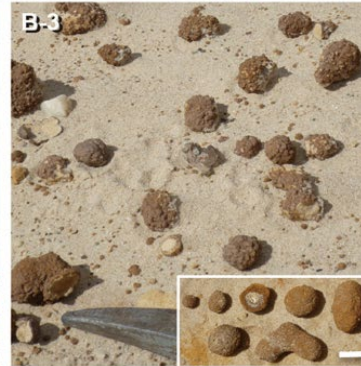
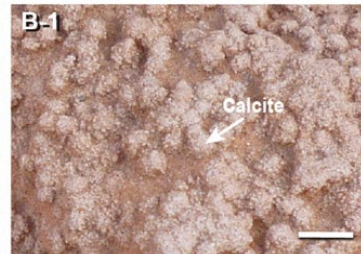
Monument Science Headliners

Martian Blueberries

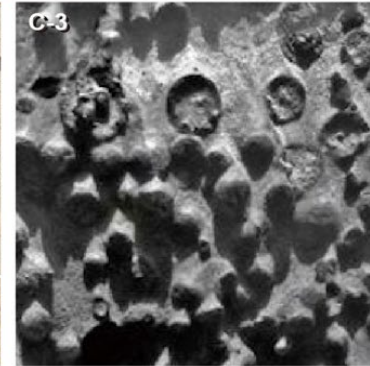
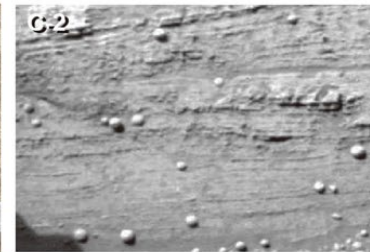
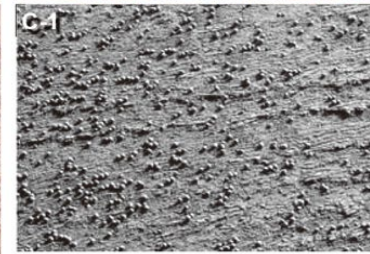
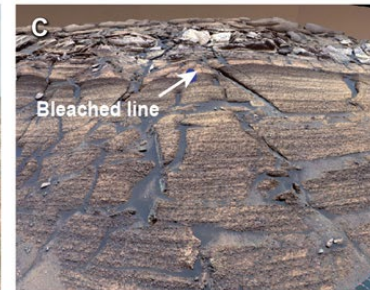
USA Utah



Mongolia Gobi



Mars Meridiani





Monument Science Headliners

New Dinosaur Species





Monument Science Headliners

Rainbows &
Unicorns
Taphonomy

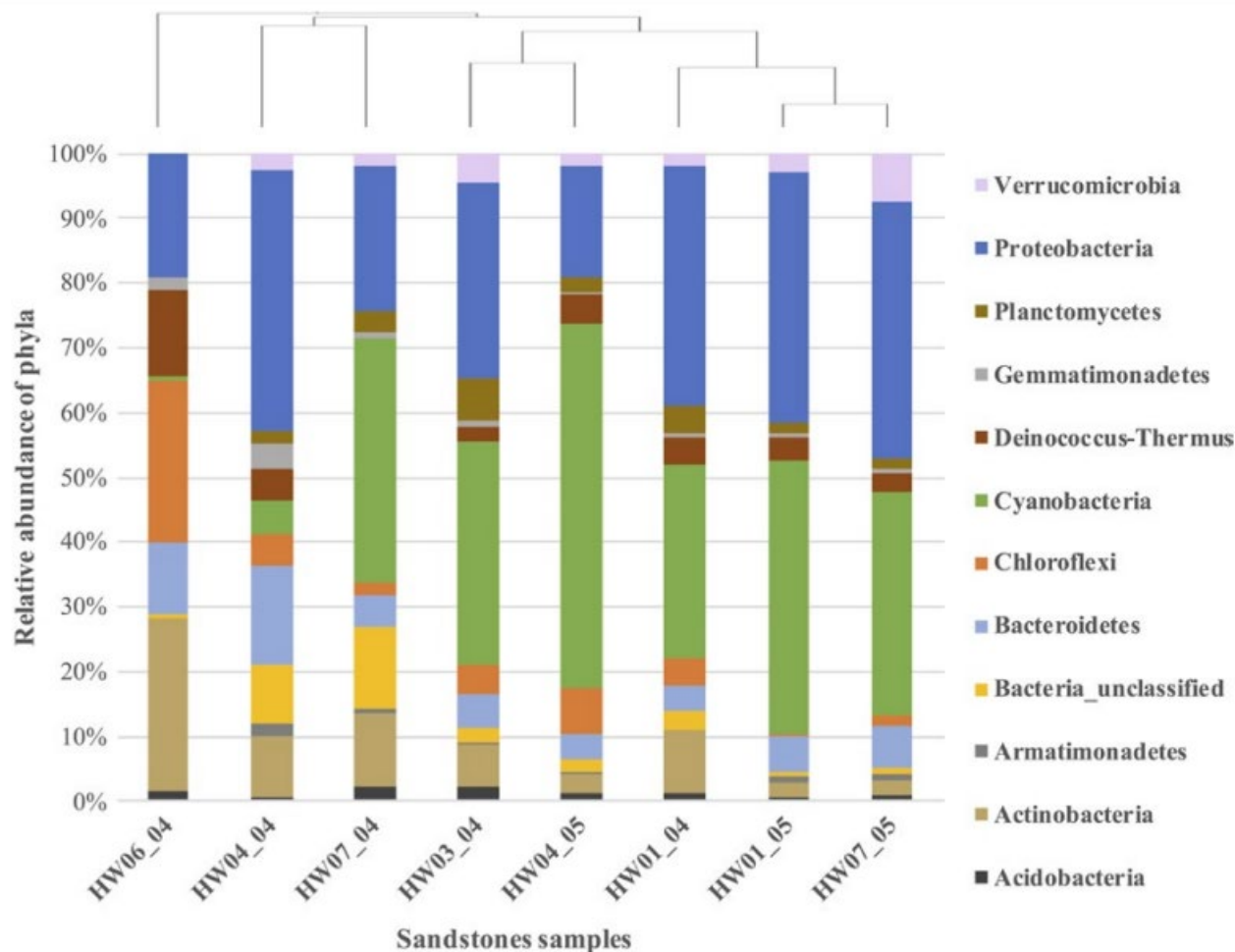




Monument Science Projects-

Kurtz-Clemson University

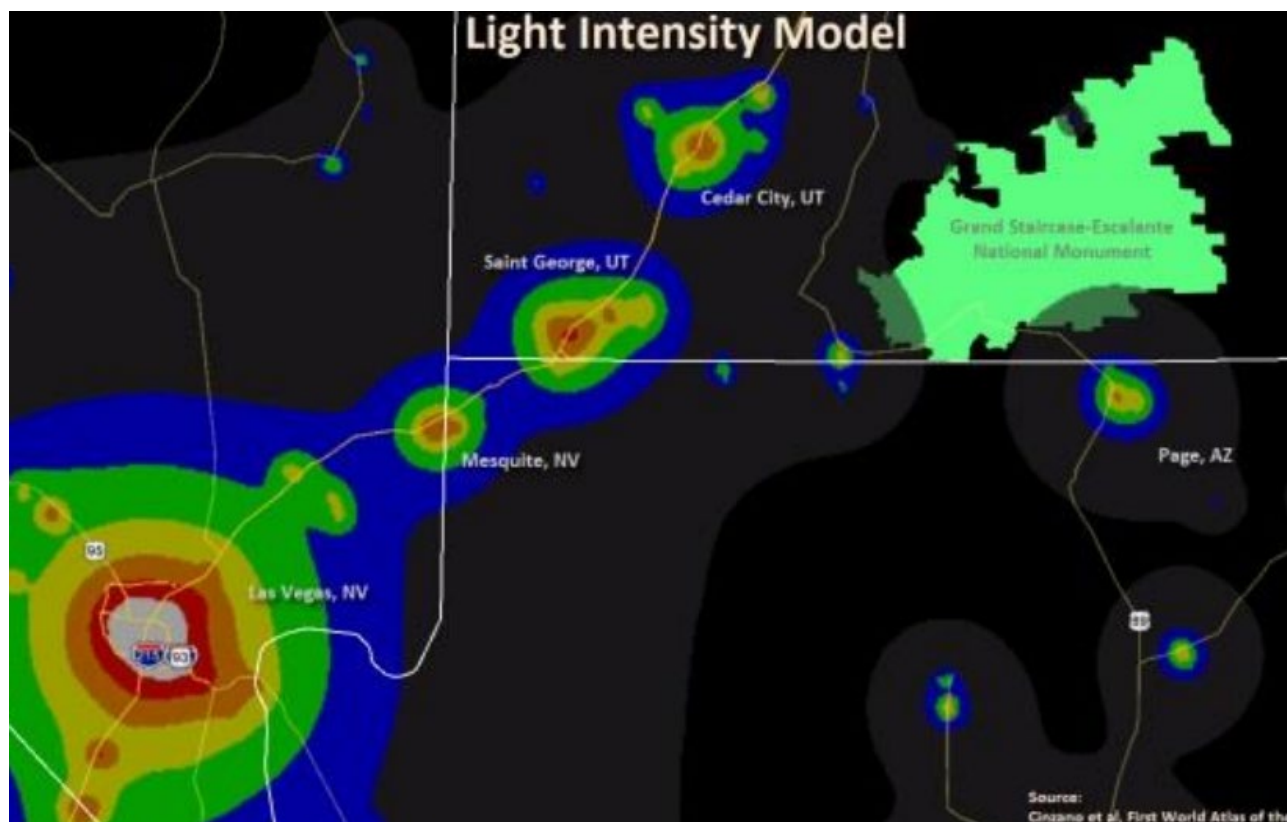
Endolithic
Microbes-
Rock surfaces
host extremely
diverse flora





Dark Skies Inventory-Weber State Univ.

Some of the
darkest skies on
the Colorado
Plateau





Pollen
Coring/Dendro
chronolgy-
50 Mile
Mountain
Douglas Fir
completely
replaced by
Pinyon pine
starting 900
years ago





Native Bee Studies-

660 species=17% total
diversity of North America





Mexican Spotted Owl Habitat Modeling-suitable habitat in many remote canyons





Penstemon Genetics

17 species including 2 endemics and hybrids





Recreation
Baseline Study-
Most of the
nearly one million
tourists are
seeking
“Naturalness &
Tranquility”





How to Build a Healthy Science Program

- Develop a Science Plan that emphasizes both basic and applied research
- Ensure staff positions are filled by experienced researchers fluent in the scientific method
- Require staff to engage with the broader research community
- Prioritize research in budget
- Maintain an effective communication plan for disseminating research results to upper management/public
- Do annual reviews on how scientific advancements can be integrated into management and public education/interpretation



MAC HOMEWORK ASSIGNMENT

- Work on Monument Science Plan
 - Current draft (2019) is essentially a list of applied science priorities
- Needs revision to more accurately reflect NCL science directives
- NEEDS YOUR INPUT!!
 - You don't need to be a scientist to make meaningful contribution
 - Preliminary input by October meeting



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THANK YOU!

