APPALACHIAN
LANDSCAPE CONSERVATION COOPERATIVE

Foundational	Stressor / Threat	Vulnerability / Impact	Management Response / DST
A Stream Classification System for the Appalachian Landscape Conservation Cooperative	Assessing Future Impacts of Energy Extraction in the Appalachian Mountains (wind, oil, gas, coal)	Support for Understanding Land Use and Climate Change in the Appalachian Landscape	Development of a Hydrologic Foundation and Flow-ecology Relationships for Monitoring Riverine Resources in the Marcellus Shale Region
Classification and Geo-Referencing Cave/Karst Resources across the Appalachian LCC	Preliminary Assessment and Inventory (Landscape-level) Threats across the Appalachian Landscape:	Preliminary Assessment and Inventory of Ecosystem Services across the Appalachian Landscape:	Web-Based Tool for Riparian Restoration Prioritization to Promote Climate Change Resilience in Eastern US Streams

2015-07-14_Snapshot & Update of Deliverables – Funded Research (FY 12+13 w/ Mod. for FY14)

AppLCC Funding FY11/12 + 13

http://applcc.org/research

Timeline

(1) TAKE ACTION / INVEST => NOW

(2) MAKE DECISION => NEAR-TERM

(3) PLAN TO ACHIEVE MANDATE => LONGER-TERM

[Project Activities / Fiscal investment] → [Regulatory Responsibilities / Partnering / Consultation] → [Mandate / Proactive / Engagement]

Timeline

(1) TAKE ACTION / INVEST => NOW

[Project Activities / Fiscal investment]

Tools & Research Products — Illustrative Q. / Scenarios

[Riparian Tool]

(Physical Constraints) User Defined Values "Scenario-based"

+data

[Cave/Karst Biodiversity Mapping]

(Modeler Defined Values) Observational Correlation => Create Index / Inventory then Model Probability

Decision-support

Riparian Restoration & Prioritization Tool - Climate Change Resilience

PI (Organization):
Nislow (USFS)
Coombs (Umass)
Hudy (USGS)

Project FY11/12 - #5 – Decision Support Tool

Web-Based Tool for Riparian Restoration Prioritization to Promote Climate Change Resilience in Eastern US Streams

- Develop a user-friendly web-based tool to identify priority areas for riparian restoration in the context of predicted climate change at the appropriate scale needed by practitioners.
- A 'shovel ready' prioritization tool for managers facing immediate on-the-ground decisions will be developed.
- [[Research linked directly to ongoing and future stream flow, temperature, and biological response modeling projects and decision support tools.]]

Narrative | Model | GIS data

Riparian Prioritization for Climate Change Resilience Tool

AppLCC Funded Research

USGS

Mark Hudy, PI

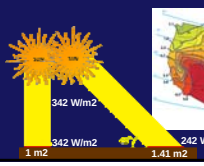
Keith Nislow, Co-PI

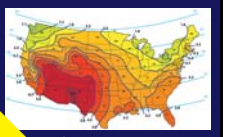
Jason Coombs
Tool Development

UMassAmherst

Design Approach

- Focus on key metrics; elevation; percent canopy cover and solar gain,; metrics that directly relate to managers whose restoration activities focus on tree planting in riparian corridors

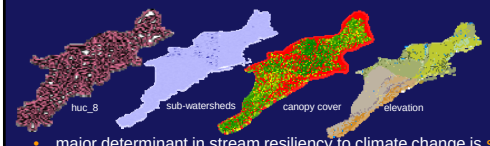




(Source: Fu and Rich 1999; PRISIM 2007; USGS 2008; USGS 2009).

Riparian Prioritization for Climate Change Resilience Tool

Geospatial Layers: Open Source GeoNode (GIS Server)



- major determinant in stream resiliency to climate change is solar gain^

- **^heat gain from solar radiance striking the surface: (solar gain), which is codetermined by geography (slope, aspect, elevation, topography, and latitude) and the extent to which streams are shaded by riparian vegetation**

(Source: Fu and Rich 1999).

Timeline

(1) TAKE ACTION / INVEST => NOW

[Project Activities / Fiscal investment]

Tools & Research Products — Illustrative Q. / Scenarios

[Riparian Tool]

(Physical Constraints) User Defined Values "Scenario-based"

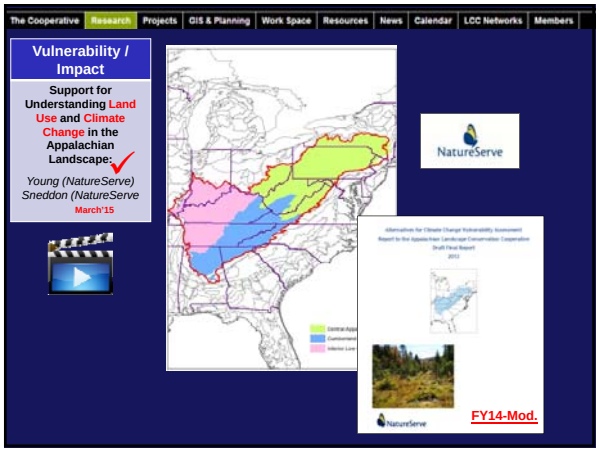
[Cave/Karst Biodiversity Mapping]

(Modeler Defined Values) Observational Correlation => Create Index / Inventory then Model Probability

[Climate Tools Review]

Expert Opinion

+data



Timeline

(1) TAKE ACTION / INVEST => NOW

(2) MAKE DECISION => NEAR-TERM

[Regulatory Responsibilities / Partnering / Consultation]

Illustrative Q. / Scenarios

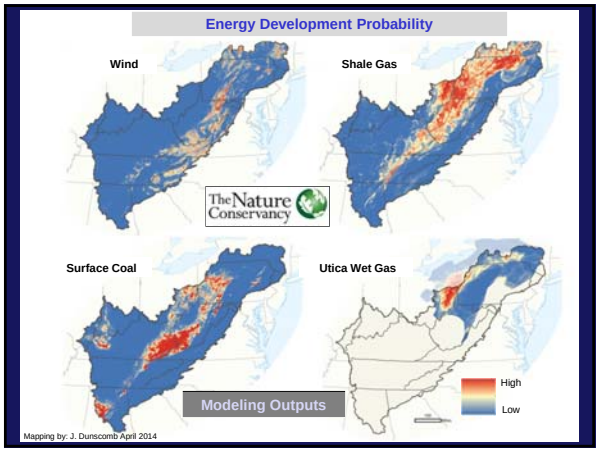
[Energy Tool]

(Physical Constraints) Non-Parametric Statistical Correlation => Industry Response Probability Modeling

+data

Near term planning efforts to help reduce impacts of currently proposed projects on a local scale.

Use of tool in conjunction with appropriate data layers -- to identify the preferred locations for energy development on a landscape scale.



Timeline

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(2) MAKE DECISION => NEAR-TERM

[Regulatory Responsibilities / Partnering / Consultation]

Illustrative Q. / Scenarios

[Energy Tool]

(Physical Constraints) Non-Parametric Statistical Correlation => Industry Response Probability Modeling

[Stream Classification]

Expert Opinion

+data

Foundational

A Stream Classification System for the Appalachian Landscape Conservation Cooperative

Project FY11/12 - Foundational

A Stream Classification System for the Appalachian Landscape Conservation Cooperative

- This project will develop a hierarchical classification for stream and river systems and a GIS map for aquatic ecosystems within the Appalachian LCC.
- The study will include a report describing the methods used to evaluate and develop the classification system,
- a literature review of existing stream classifications, and
- a GIS stream data set.

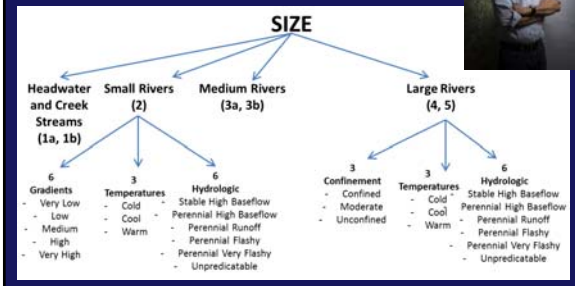
PI (Organization):
Anderson (TNC)
Olivier (ORNL)

Narrative | Flip & QA | Story Map | GIS data

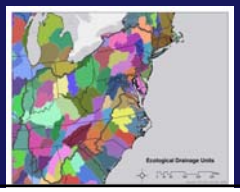
Round Robin

The Nature Conservancy

- Do you agree with the Summary variable
- Ranking of Variable Results?



Regional Scale Classification



Timeline

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(2) MAKE DECISION => NEAR-TERM

[Regulatory Responsibilities / Partnering / Consultation]

Illustrative Q. / Scenarios

[Energy Tool]

(Physical Constraints) Non-Parametric Statistical Correlation => Industry Response Probability Modeling

[Stream Classification]

Expert Opinion

[Aquatic Flows / Monitoring]

Data-defined Statistical Correlation

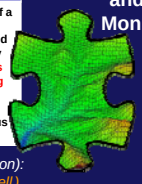
+data

Management Response / DST

Development of a Hydrologic Foundation and Flow-ecology Relationships for Monitoring Riverine Resources in the Marcellus Shale Region

Project FY11/12 - Regional Impacts

Development of a Hydrologic Foundation and Flow-ecology Relationships for Monitoring Riverine Resources in the Marcellus Shale Region



- Study provides a report assessing availability of hydrologic and ecological flow model(s) suitable for the region,
- georeference assessment of available ecological data to inform the flow model,
- the application of the model to anticipate how altered flow regimes will affect critical conditions,
- and a report that forecasts changes in hydrology and associated predicted biological responses in relation to different water resource development scenarios for critical watersheds.

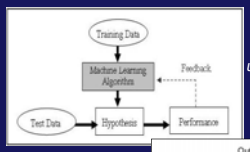
PI (Organization):
Walter (Cornell)
& Buchanan

Narrative | Flip Book | Model

…expand datasets, develop predictive model (multi-model, iterative runs)

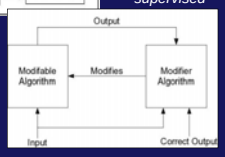
The Nature Conservancy

(non-parametric statistics & machine learning^)

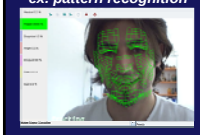


unsupervised

supervised



ex. pattern recognition



^machine learning – subfield of computer science and statistics ("artificial intelligence") =>

=> construction and study of algorithms (mathematical relationships) that learn from data

Cutting-Edge

Timeline

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(2) MAKE DECISION => NEAR-TERM

[Regulatory Responsibilities / Partnering / Consultation]

Illustrative Q. / Scenarios

[Energy Tool]

(Physical Constraints) Non-Parametric Statistical Correlation => Industry Response Probability Modeling

[Stream Classification]

Expert Opinion

[Aquatic Flows / Monitoring]

Data-defined Statistical Correlation

[Climate Sensitivity Data]

Expert Opinion / Observational

+data

Timeline

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[Mandate / Proactive / Engagement]

Illustrative Q. / Scenarios

Identify most important areas on a landscape scale for protection of valued resources

[Landscape Model Products]

(Species-Habitat Relationships) Expert Opinion – Modeler Defined Values (using Stakeholder input)

[CC Vulnerability Analysis]

Expert Opinion / Observational

+data

Vulnerability / Impact

Support for Understanding Land Use and Climate Change in the Appalachian Landscape

Project FY11/12 - Climate Change

Support for Understanding Land Use and Climate Change in the Appalachian Landscape

- Compile climate change vulnerability assessments and use a team of expert peer reviewers to recommend the most efficient, effective, and appropriate methods for adoption by the AppLCC for conservation and adaptation planning.
- Recommended method will then be deployed, resulting in vulnerability assessments for a suite of key species / habitats selected in consultation with partners of the AppLCC
- Create a database of the vulnerability assessments of selected sp / habitat.

PI (Organization):
Young (NatureServe)
Sneddon (NatureServe)

Narrative | Flip & QA | Excel data | Habitat Classification

Timeline

(1) TAKE ACTION / INVEST => NOW

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[Mandate / Proactive / Engagement]

Illustrative Q. / Scenarios

[Landscape Model Products]

(Species-Habitat Relationships) Expert Opinion – Modeler Defined Values (using Stakeholder input)

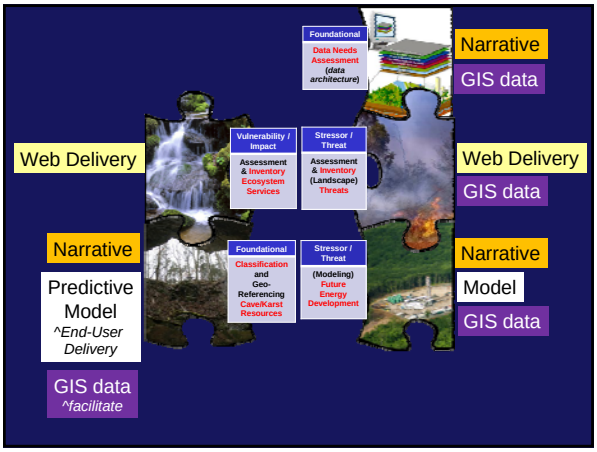
[CC Vulnerability Analysis]

Expert Opinion / Observational

[Ecosystem Services and Threats Analysis]

Observational Data

+data




AppLCC Funding
FY11/12 + 13
http://applcc.org/research


AppLCC Funding
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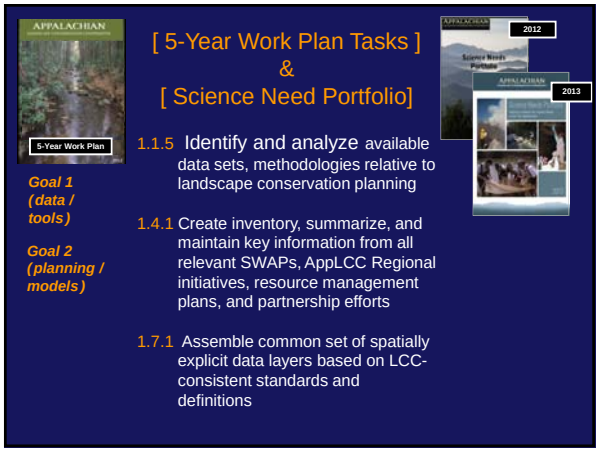
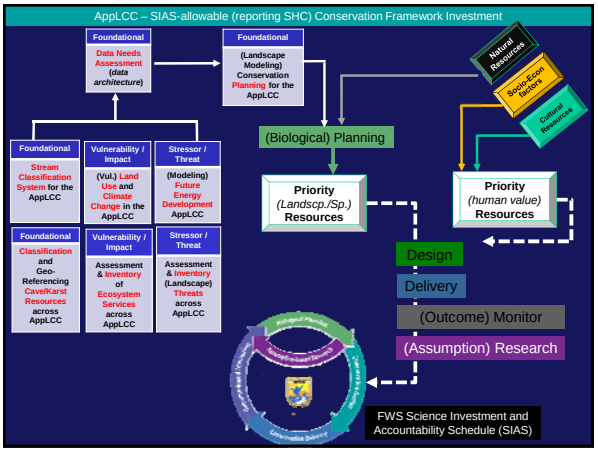

APPALACHIAN
5-Year Work Plan
[5-Year Work Plan Tasks]
&
[Science Need Portfolio]
2012
2013
Goal 1 (data / tools)
Goal 2 (planning / models)
1.1.5 Identify and analyze available data sets, methodologies relative to landscape conservation planning
1.4.1 Create inventory, summarize, and maintain key information from all relevant SWAPs, AppLCC Regional initiatives, resource management plans, and partnership efforts
1.7.1 Assemble common set of spatially explicit data layers based on LCC-consistent standards and definitions


AppLCC – SIAS-allowable (reporting SHC) Conservation Framework Investment
Foundational
Data Needs Assessment (data architecture)
Foundational
(Landscape Modeling) Conservation Planning for the AppLCC
Natural Resources
Socio-Econ Factors
Cultural Resources
Foundational
Stream Classification System for the AppLCC
Vulnerability / Impact
(Vul.) Land Use and Climate Change in the AppLCC
Stressor / Threat
(Modeling) Future Energy Development AppLCC
(Biological) Planning
Priority (Landscp./Sp.) Resources
Priority (human value) Resources
Foundational
Classification and Geo-Referencing Cave/Karst Resources across AppLCC
Vulnerability / Impact
Assessment & Inventory of Ecosystem Services across AppLCC
Stressor / Threat
Assessment & Inventory (Landscape) Threats across AppLCC
Design
Delivery
(Outcome) Monitor
(Assumption) Research
FWS Science Investment and Accountability Schedule (SIAS)