*So*cia*l V*alues for *E*cosystem *S*ervices (SolVES)

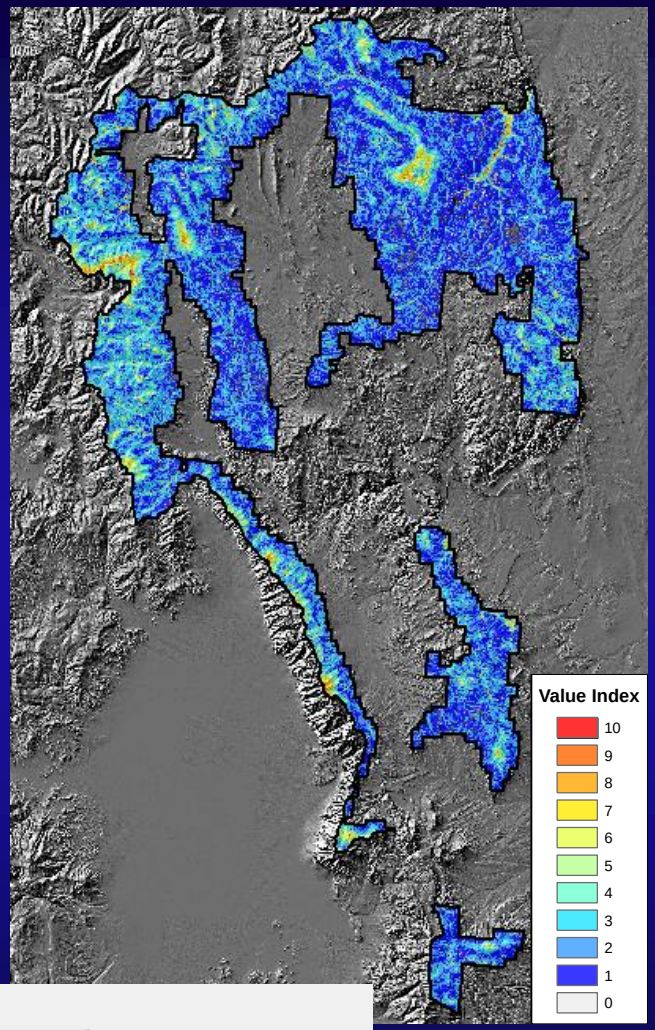
Presented to the Chesapeake Bay Program Scientific, Technical Assessment and Reporting (STAR) Team Meeting

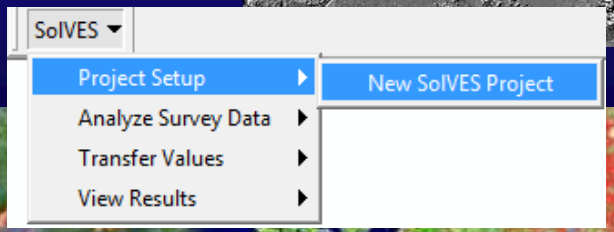
Annapolis, Maryland
November 5, 2012

U.S. Department of the Interior
U.S. Geological Survey

What is SolVES?

- A GIS tool for incorporating non-monetary social value information into the spatial context of ecosystem services assessment (Sherrouse, Clement & Semmens, 2011).
- Calculates and maps a 10-point “Value Index”, which is a standardized, quantitative metric of nonmarket, stakeholder-perceived social values that often correspond to cultural ecosystem services (e.g., aesthetics, recreation).
- ArcGIS 9.3 toolbar.





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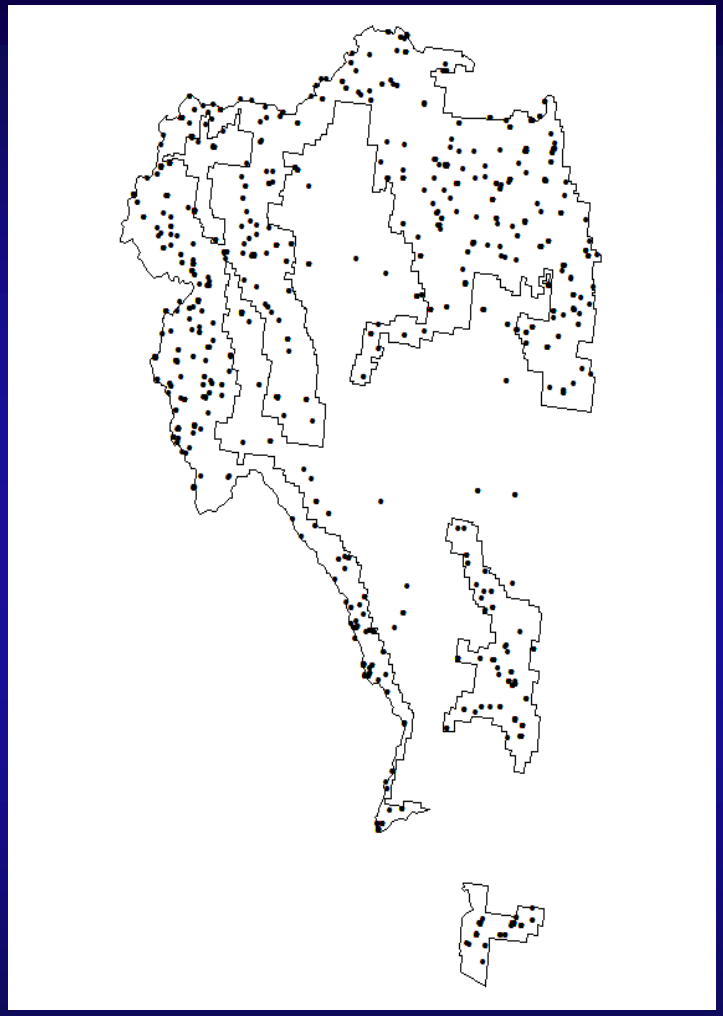
What is SolVES?

- Derives Value Index from points mapped in a value and preference survey of stakeholders to identify locations associated with a specified social value type.
- Models relationships between mapped Value Index and underlying environmental variables (e.g., elevation, land cover, distance to roads).
- Goal to assist land and resource managers with analysis and communication of trade-offs.



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What is SolVES?

AESTHETIC
BIODIVERSITY
CULTURAL
ECONOMIC
FUTURE
HISTORIC
INTRINSIC
LEARNING
LIFE SUSTAINING
RECREATION
SPIRITUAL
THERAPEUTIC

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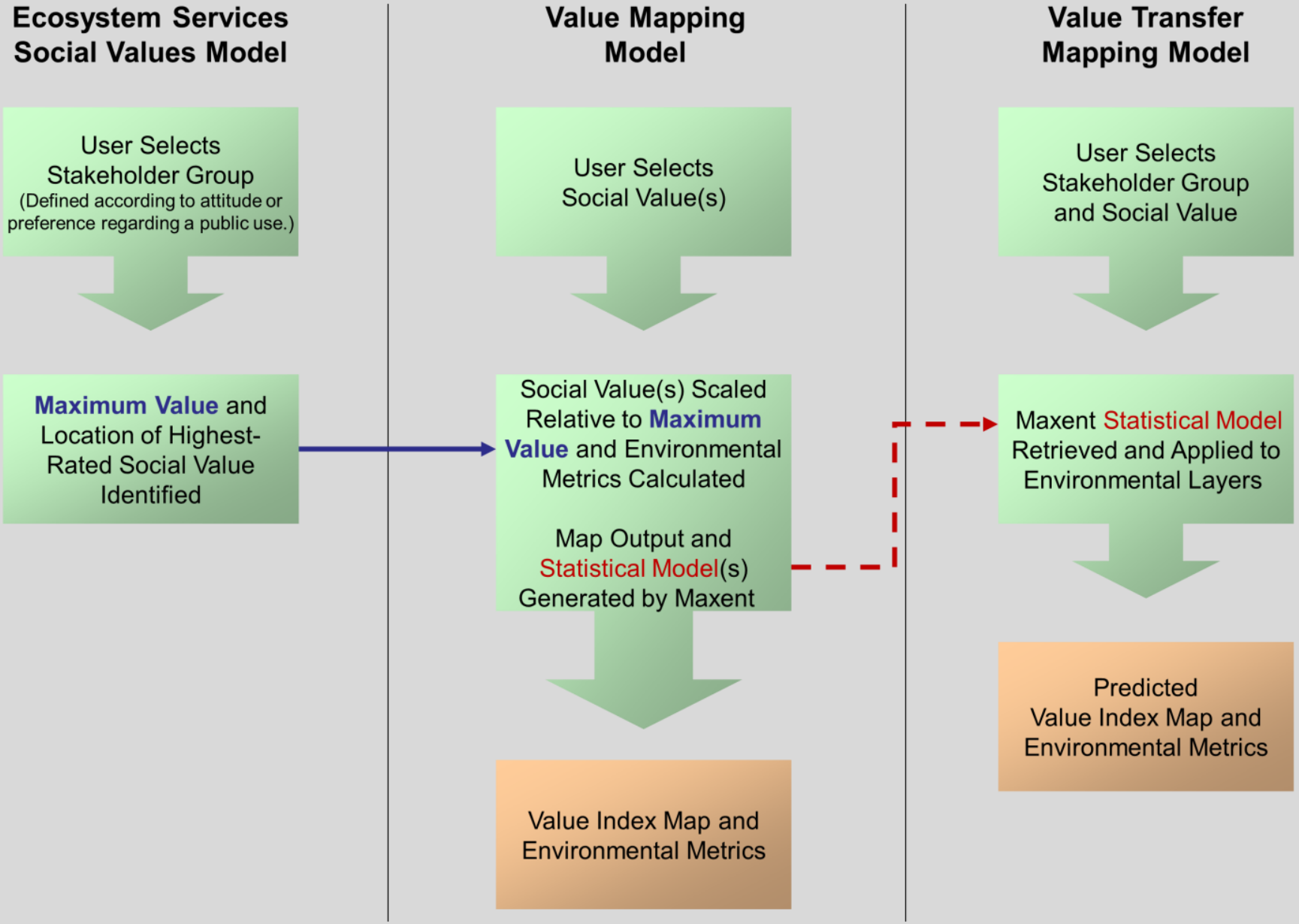
SolVES 2.0

- Integrated with Maxent maximum entropy modeling software.
  - Originally developed to model geographic distribution of species using presence only data.
  - Points mapped by survey respondents analogous to points where a species was observed.
  - Environmental variables serve as constraints to be satisfied by an estimated probability distribution.
  - Higher probability = higher social value intensity.

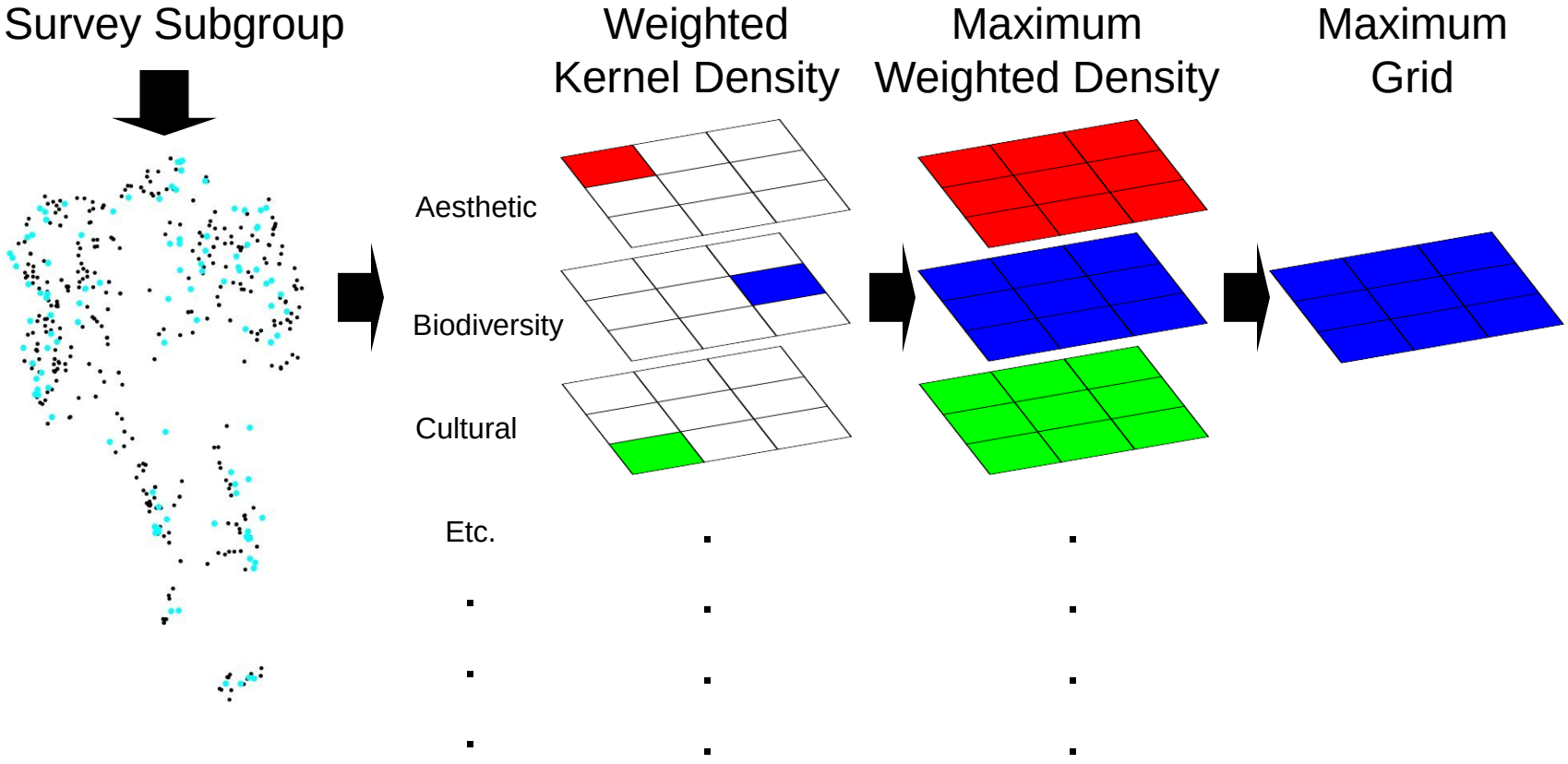
SolVES 2.0

- Integrated with Maxent maximum entropy modeling software.
  - Logistic output used in conjunction with SolVES weighted kernel density output to generate social value maps that consider the points mapped by survey respondents along with the underlying environment.
  - Generates models describing relationship between points and environmental variables.
  - Calculates Area Under the Curve (AUC) statistics that can assist with evaluating model performance for the study area and its potential for value transfer.

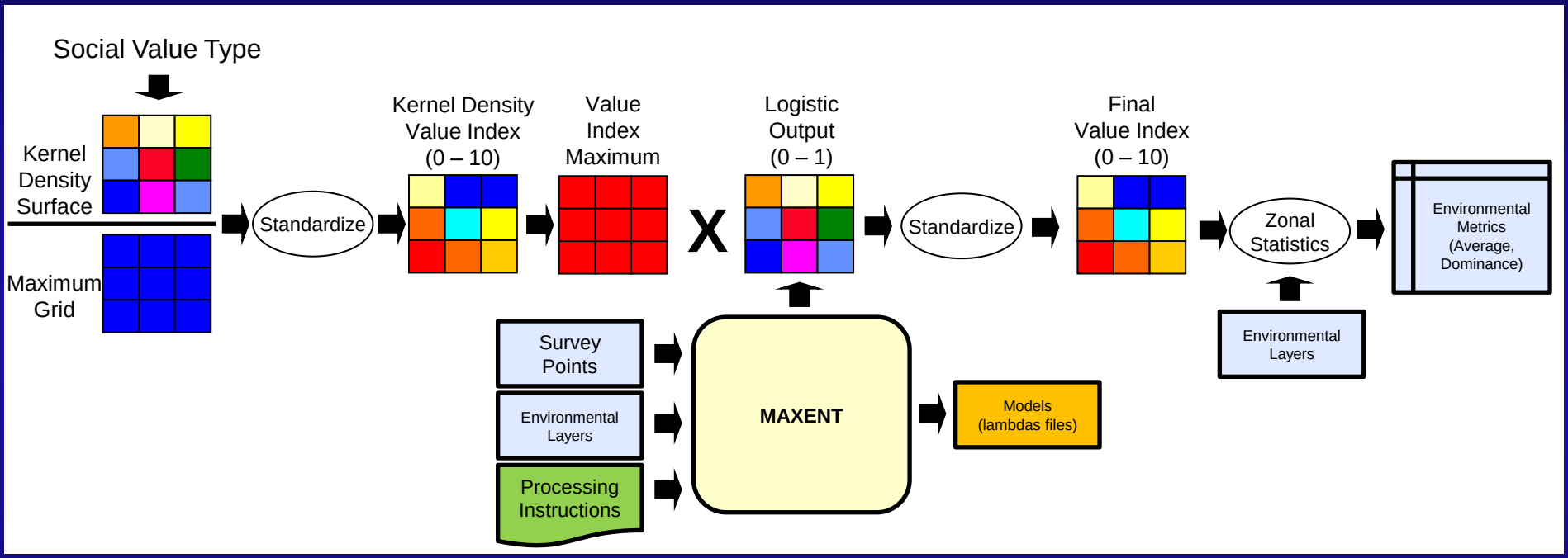
SolVES 2.0 Overview



Ecosystem Services Social Values Model



Value Mapping Model



Untitled - ArcMap - ArcInfo

File Edit View Bookmarks Insert Selection Tools Window Help

1:1,339,645

62%

SolVES

Value Map
- Boundaries
  - Study_Area_Final
- Points
  - SURVEY_POINTS_SELECT
  - Aesthetic_TRAINING_POINTS
  - Aesthetic_TEST_POINTS
  - Aesthetic_BACKGROUND_POIN
- Value Surfaces
  - Aesthetic
- Environmental
  - ELEV
  - LULC
  - LANDFORM
  - SLOPE
  - DTW
  - DTR
- Background
  - HILLSHADE

Locator Map
- Study Area
- STATES

Display Source Selection Catalog

Drawing Arial 10

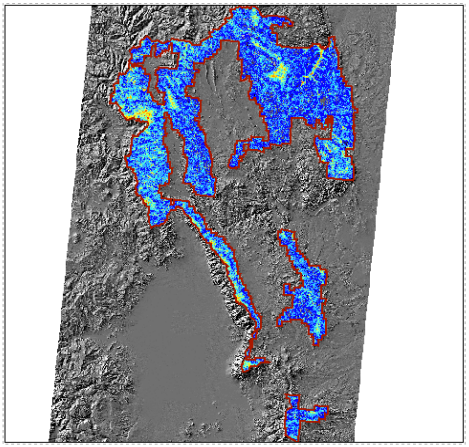
Change the font size

1.78 -0.67 Inches

Pike and San Isabel National Forest

Oil and Gas Drilling_OPPOSE

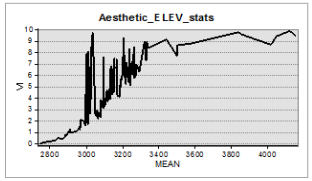
Aesthetic

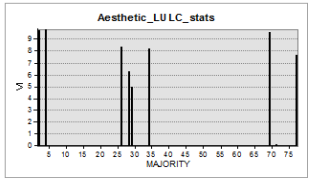


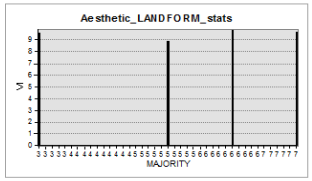
Study Area Final

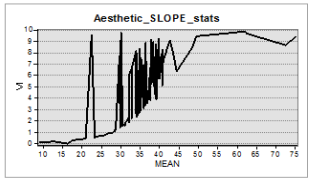
Value Index

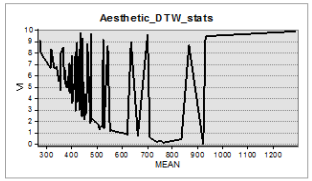
0 1 2 3 4 5 6 7 8 9 10

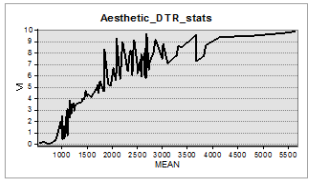


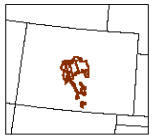












30 15 0 30 Miles

N W E S

Aesthetic
Training AUC = 0.86
Good model for study area
Test AUC = 0.8265
Good model for value transfer

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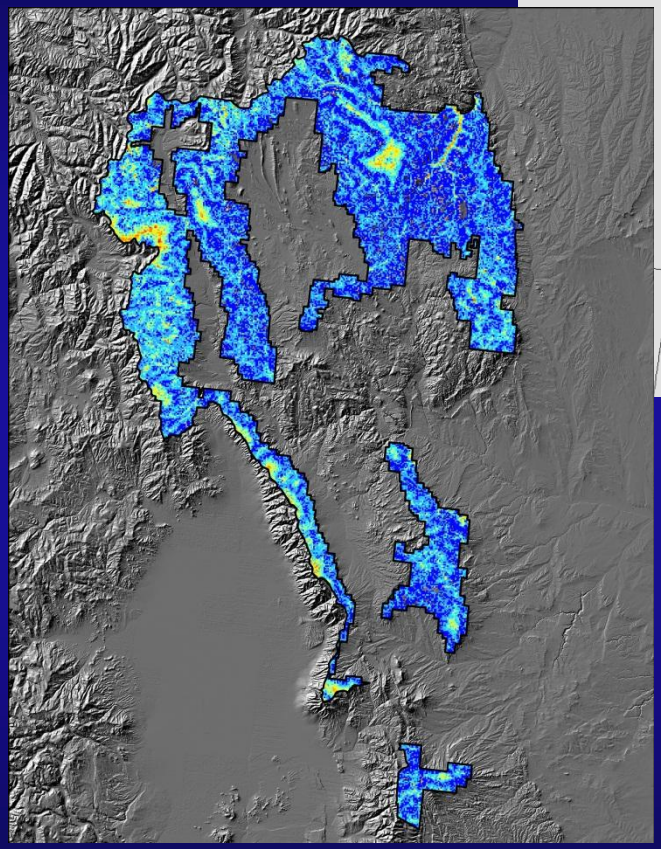
		Aesthetic	Biodiversity	Future	Life Sustaining	Recreation	Therapeutic
Public use	Attitude or preference						
Communication sites and utility easements	Favor or strongly favor	10	6	6	8	9	4
	Oppose or strongly oppose	10	8	9	8	6	4
Logging for fuels reduction	Favor or strongly favor	10	7	7	8	10	4
	Oppose or strongly oppose	10	7	7	7	5	4
Logging for increased water collection	Favor or strongly favor	10	6	6	7	9	3
	Oppose or strongly oppose	10	8	9	9	6	5
Logging for wood products	Favor or strongly favor	9	7	8	7	10	4
	Oppose or strongly oppose	10	7	8	8	6	5
Motorized recreation	Favor or strongly favor	7	5	7	5	10	3
	Oppose or strongly oppose	10	6	6	8	5	4
Oil and gas drilling	Favor or strongly favor	7	5	5	6	10	3
	Oppose or strongly oppose	10	6	7	7	6	4
All surveys[a]	N/A	10	6	8	7	7	4

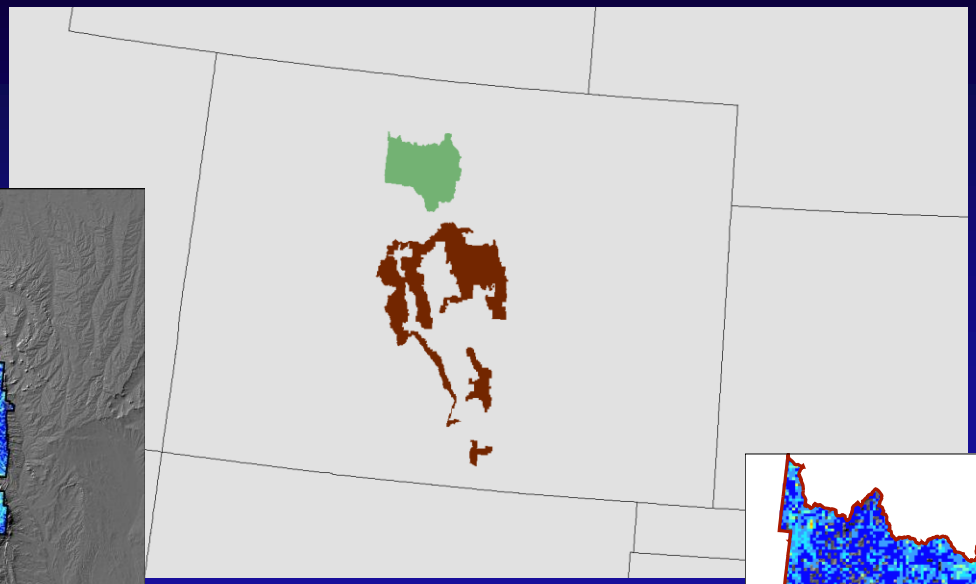
[a] Values are for all surveys regardless of public use, attitude or preference.

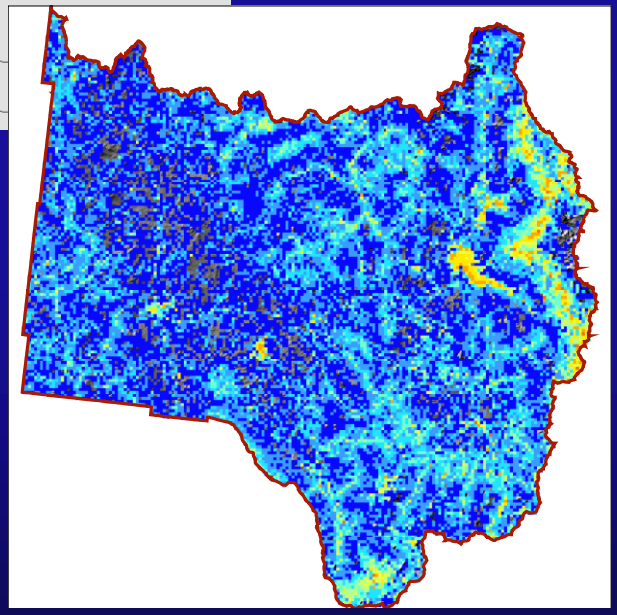
From Sherrouse, Clement & Semmens (2011)

Value Transfer

- Generate models describing relationship between Value Index and environmental variables in areas where survey data are available.
- Apply models in socially and physically similar areas where no survey data are available.







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Future Research and Development

- Continue to pursue opportunities to apply and test the tool where spatially explicit social value information can be followed through to management decisions in both terrestrial and marine environments.
- Identify environmental variables that better describe ecosystems and improve modeling of social values in a variety of environments.
- Evaluate how SolVES results compare to and complement more traditional statistical methods of social survey data analysis.
- Validate value transfer functionality in other selected study areas where primary data are available.
- Address compatibility with ArcGIS 10.x → SolVES 2.1.
- Web-based tool?

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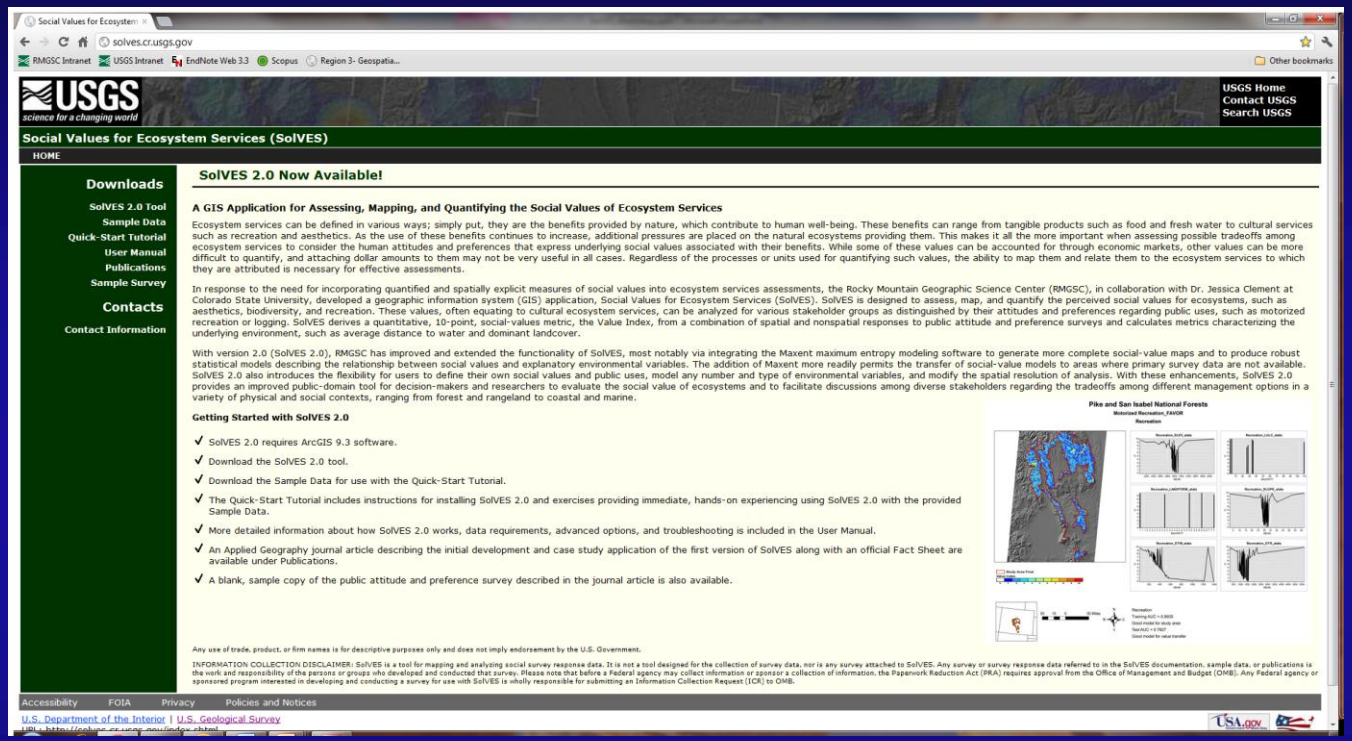

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