Colorado Wildlife Habitat Assessment Project

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Colorado State University
Knowledge to Go Places

Gary Wockner, PhD
Research Associate
Natural Resource Ecology Lab
Colorado State University

Colorado Wildlife Habitat Assessment Project

- Cooperating partners include HPP Statewide Council, CDOW, and Colorado State University

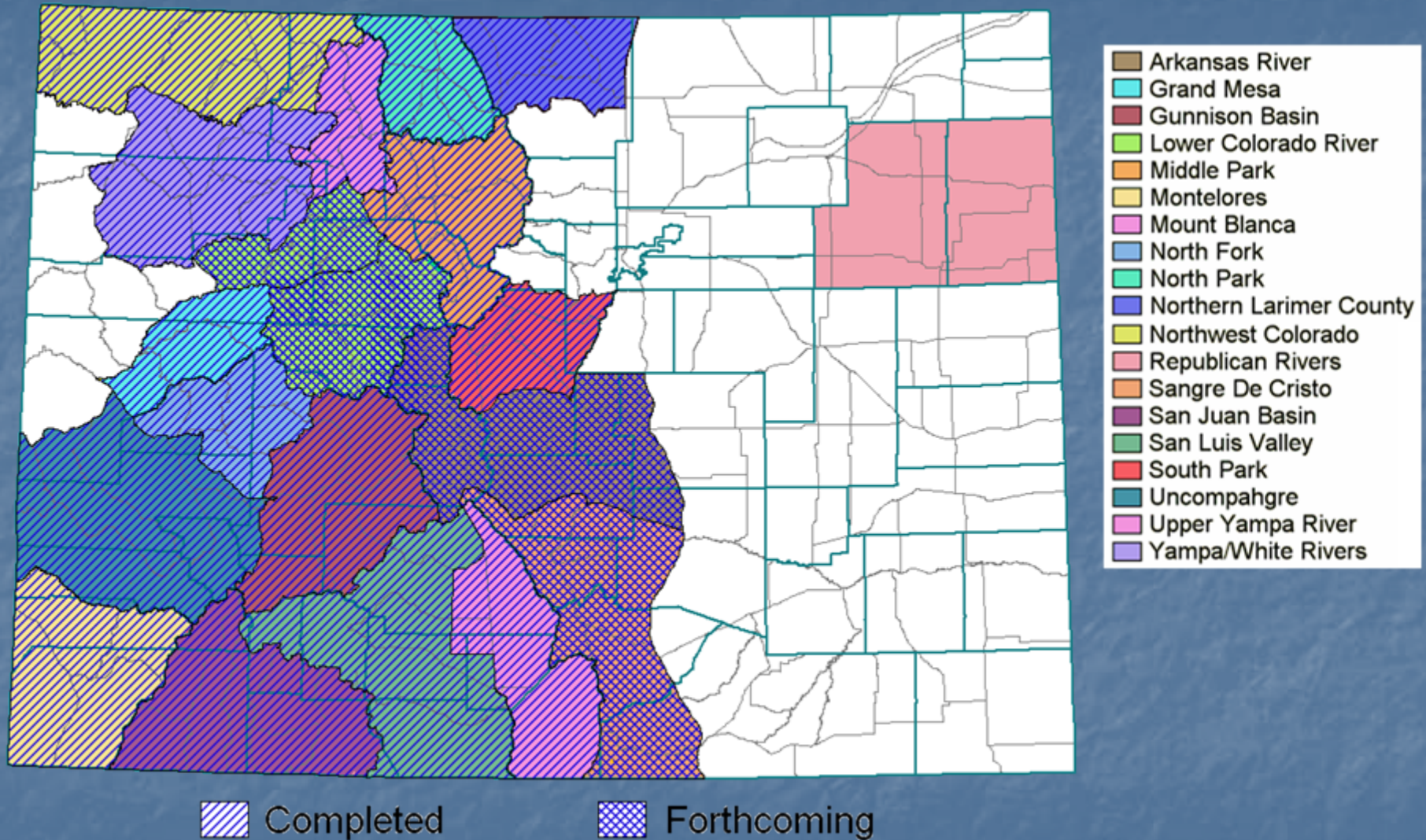- Gary Wockner, Randy Boone, and Pat Tucker

Connection with Other Projects

- National Elk Refuge/Grand Teton National Park study

- HPP committees statewide (many years of discussions)

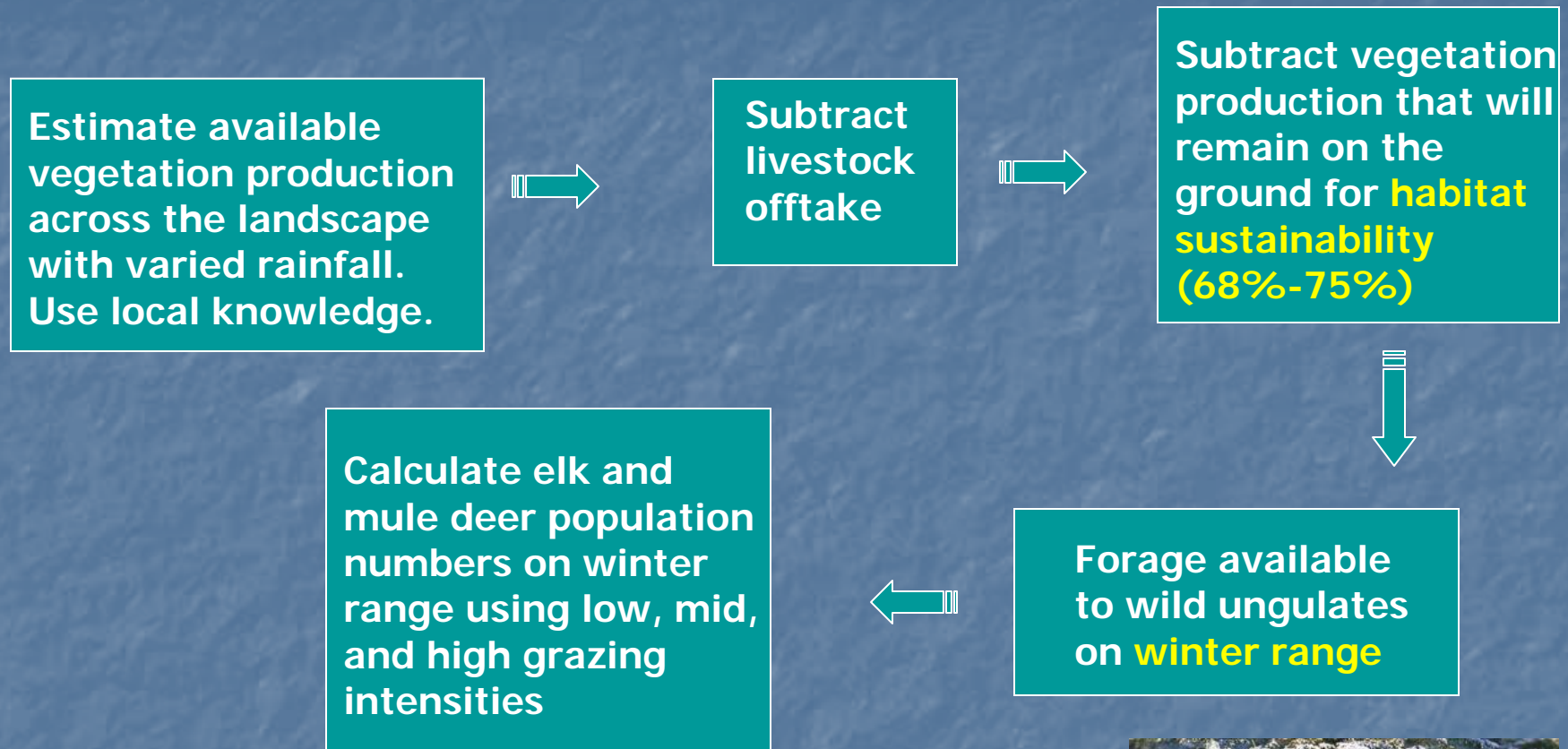- Great Sand Dunes/TNC/USGS-BRD study

Project Goals

- Estimate wild ungulate carrying capacity using ecological science and GIS habitat data at a landscape scale.

- Support decisions on wild ungulate population objectives in CDOW's DAU planning process.

- Serve the needs of HPP committees by providing a dynamic tool that can help inform questions about ungulate population numbers and distribution (conflicts: overabundance versus distribution?).

- A scientific and educational tool.

Locations of HPP Projects

Legend:
- Arkansas River
- Grand Mesa
- Gunnison Basin
- Lower Colorado River
- Middle Park
- Montelores
- Mount Blanca
- North Fork
- North Park
- Northern Larimer County
- Northwest Colorado
- Republican Rivers
- Sangre De Cristo
- San Juan Basin
- San Luis Valley
- South Park
- Uncompahgre
- Upper Yampa River
- Yampa/White Rivers

Completed   Forthcoming

Model results are generated for all DAUs, GMUs, and subherds as requested by the HPP committee.

GIS-Based Model Processes

Estimate available vegetation production across the landscape with varied rainfall. Use local knowledge.

➡️

Subtract livestock offtake

➡️

Subtract vegetation production that will remain on the ground for **habitat sustainability (68%-75%)**

⬇️

Calculate elk and mule deer population numbers on winter range using low, mid, and high grazing intensities

⬅️

Forage available to wild ungulates on **winter range**

Questions driving the model:
How much forage is available?
How much forage do livestock consume?
How much forage should remain on the ground?
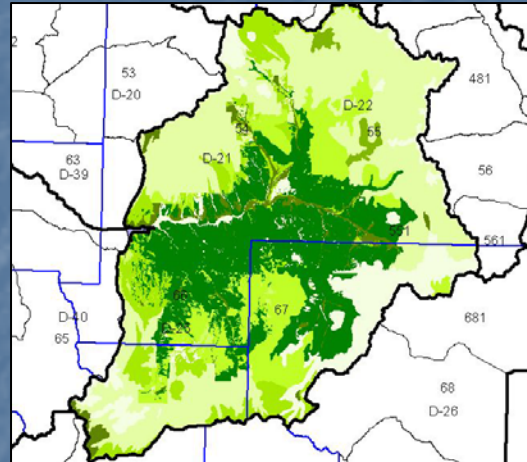How many wild ungulates can be supported with remaining forage?
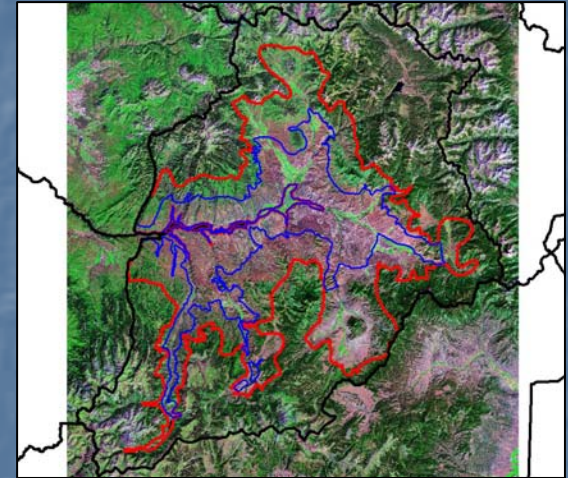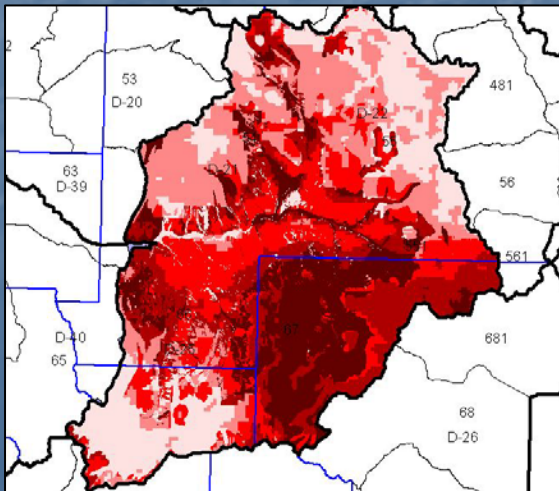
GIS input maps: Gunnison

Study Area
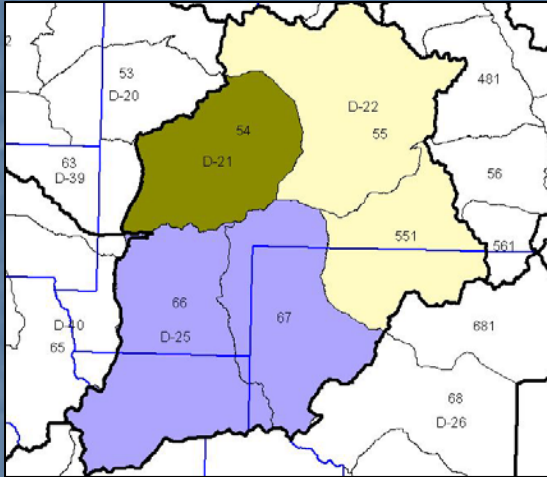
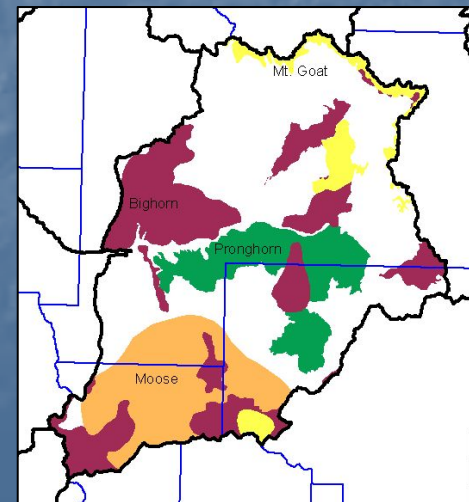**Available Forage Production NRCS soils data**

Elk and Deer Winter Range Areas (CDOW)

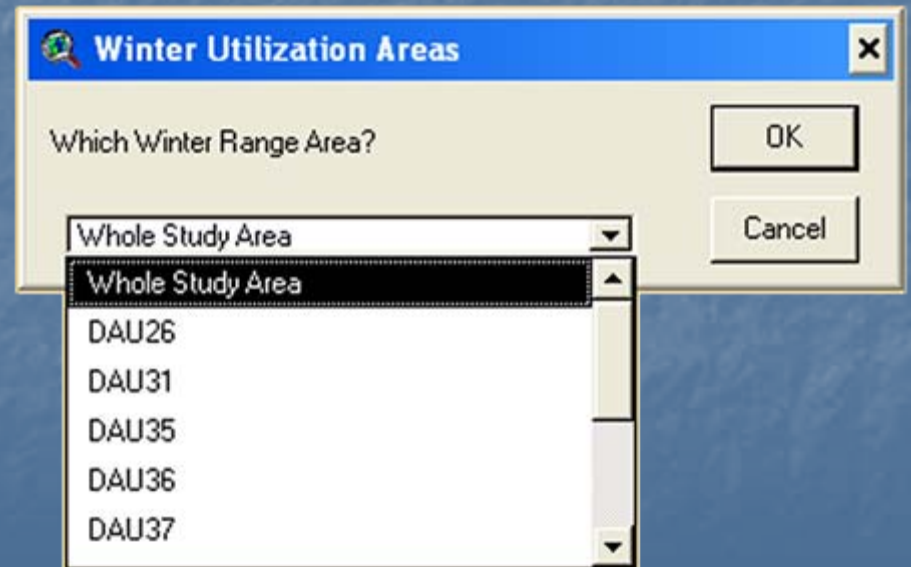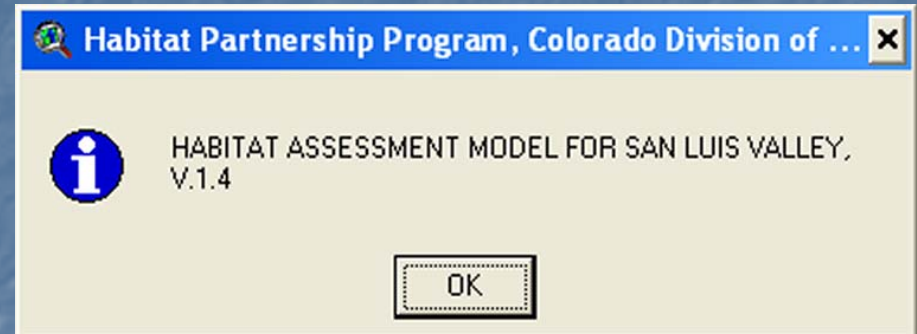**Livestock Offtake (CO Ag Stats/satellite/landowners)**
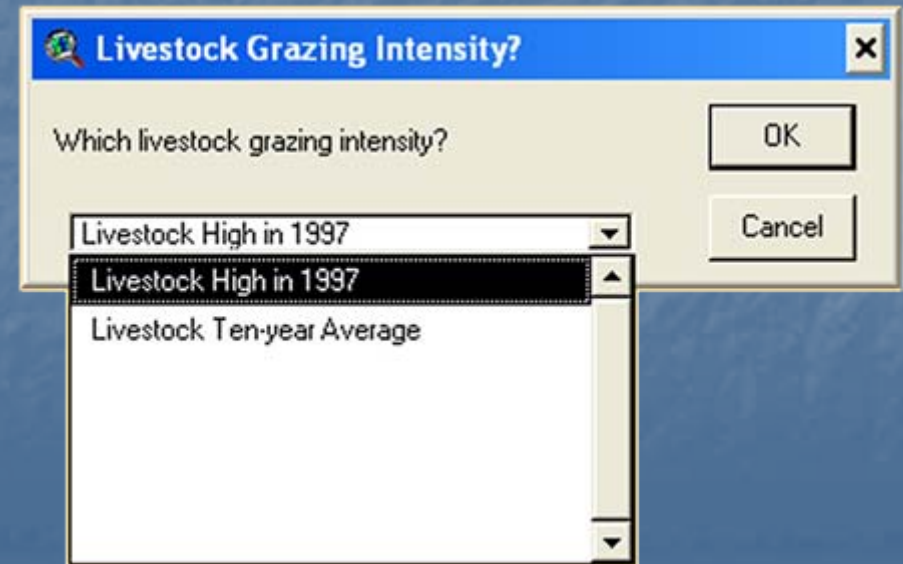

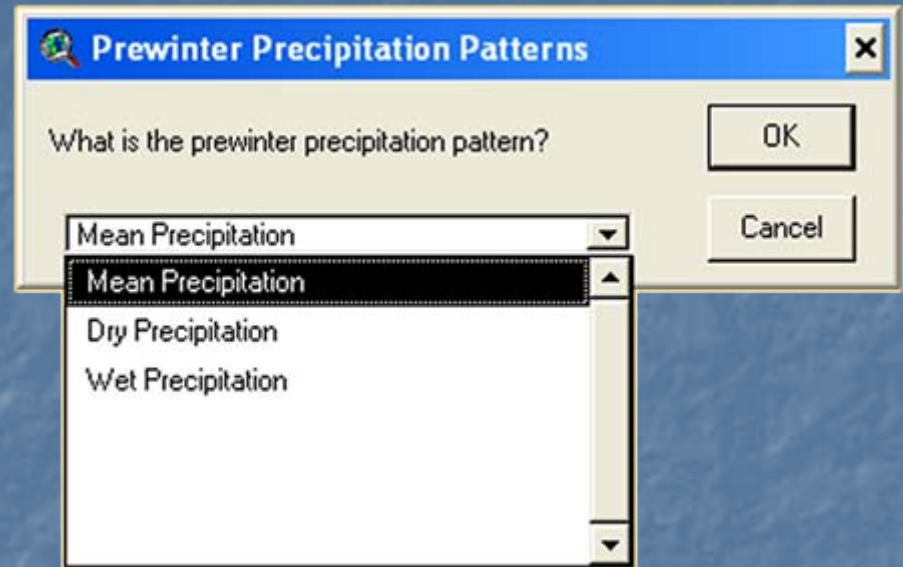
Other Wild Ungulate (CDOW)

Running the HAM Model

- After an introductory window showing the model version ...

- The area of interest is selected, either the whole area, smaller data analysis units, or the smallest, game management units.
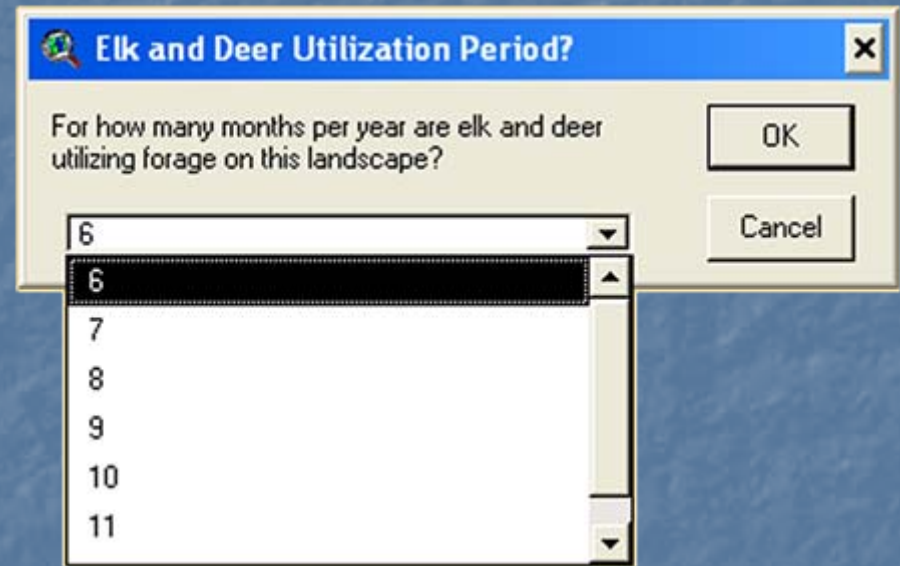
Running the HAM Model

- The amount of pre-winter precipitation is set.
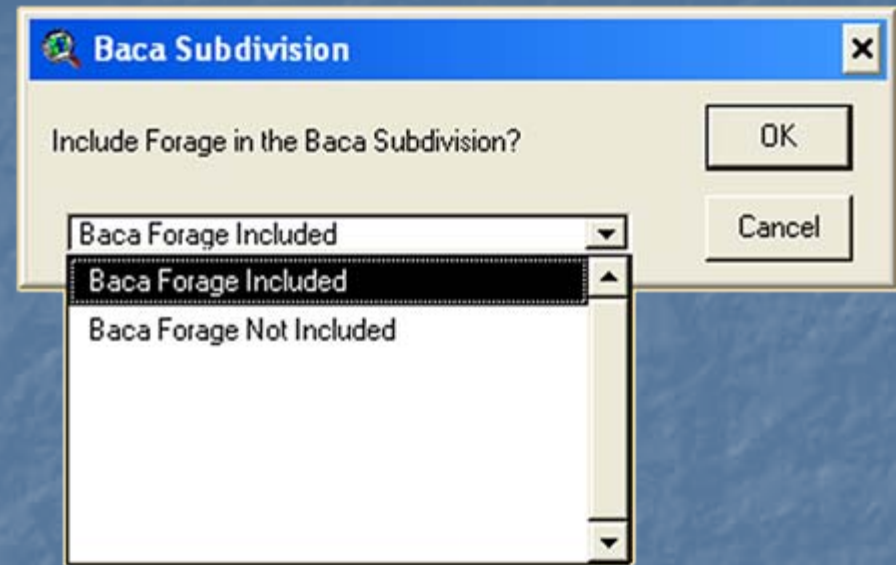
- The livestock grazing intensity is selected.

Running the HAM Model

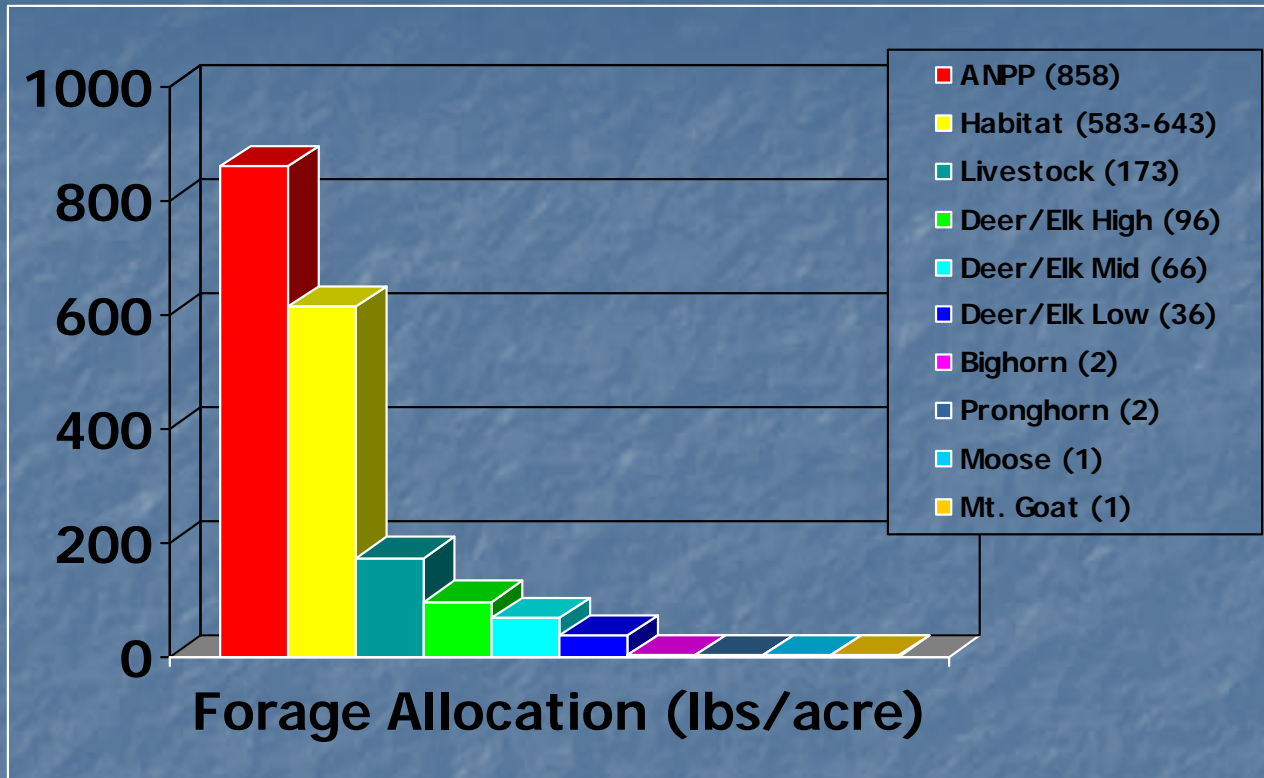- The number of months elk and deer are on their winter ranch is selected.

Running the HAM Model

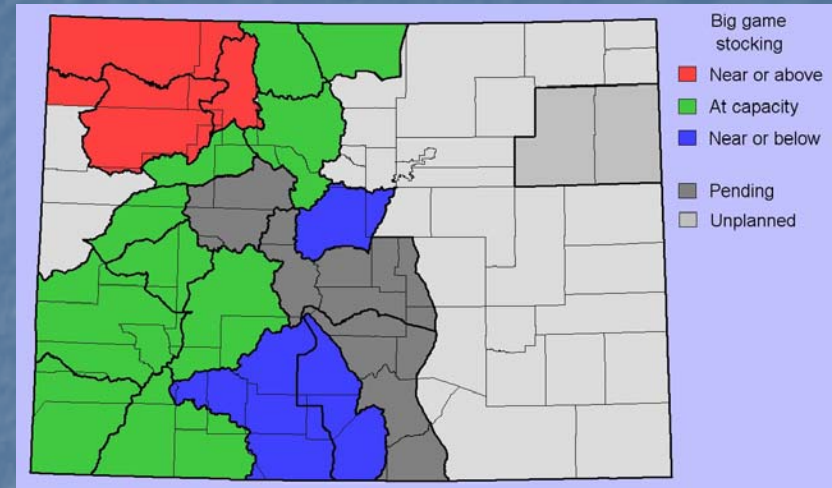- Committee-specific settings may be made.

Model Output Gunnison

Forage Allocation (lbs/acre)

Legend:
- ANPP (858)
- Habitat (583-643)
- Livestock (173)
- Deer/Elk High (96)
- Deer/Elk Mid (66)
- Deer/Elk Low (36)
- Bighorn (2)
- Pronghorn (2)
- Moose (1)
- Mt. Goat (1)

Mean Precipitation, Severe Winter Range, Whole Study Area, Livestock Long-term Average, 6 Months Wildlife

% Elk	Elk Low Threshold	Elk Midpoint	Elk High Threshold	Deer Low Threshold	Deer Midpoint	Deer High Threshold	% Deer
0	0	0	0	33663	56702	79742	100
10	2729	4597	6466	24561	41373	58194	90
20	4590	7732	10874	18360	30928	43496	80
30	5941	10007	14073	13860	23346	32832	70
40	6965	11732	16498	10448	17598	24747	60
50	7768	13085	18402	7768	13085	18402	50
60	8417	14178	19939	5606	9443	13279	40
70	8947	15071	21195	3838	6465	9093	30
80	9394	15824	22254	2349	3956	5564	20
90	9773	16462	23152	1085	1827	2570	10
100	10099	17011	23923	0	0	0	0

What We Have Learned

- **Carry Capacity Estimates (area-wide):**
  - North Park = At carrying capacity
  - Middle Park = At carrying capacity
  - Northwest = At or above carrying capacity
  - Yampa/White River = At or above carrying capacity
  - Upper Yampa River = At or above carrying capacity
  - San Luis Valley = At or below carrying capacity
  - Mount Blanca = At or below carrying capacity
  - South Park = At or below carrying capacity
  - Gunnison = At carrying capacity
  - San Juan Basin = At carrying capacity
  - Montelores = At carrying capacity
  - Grand Mesa = At carrying capacity
  - North Fork Gunnison = At carrying capacity
  - Uncompahgre = At carrying capacity
 - Northern Larimer County = At or below carrying capacity

Big game stocking
- Near or above (red)
- At capacity (green)
- Near or below (blue)
- Pending (dark gray)
- Unplanned (light gray)

- **The model successfully represents what we see on the ground.**

- **The model yields similar results to much more complicated and expensive models.**

- **Conflicts: The model informs the question of ungulate overabundance versus distribution, and the related solution of culling versus dispersion.**

- **The model allows us to visually portray habitat tradeoffs, and informs management decisions.**

Model Package
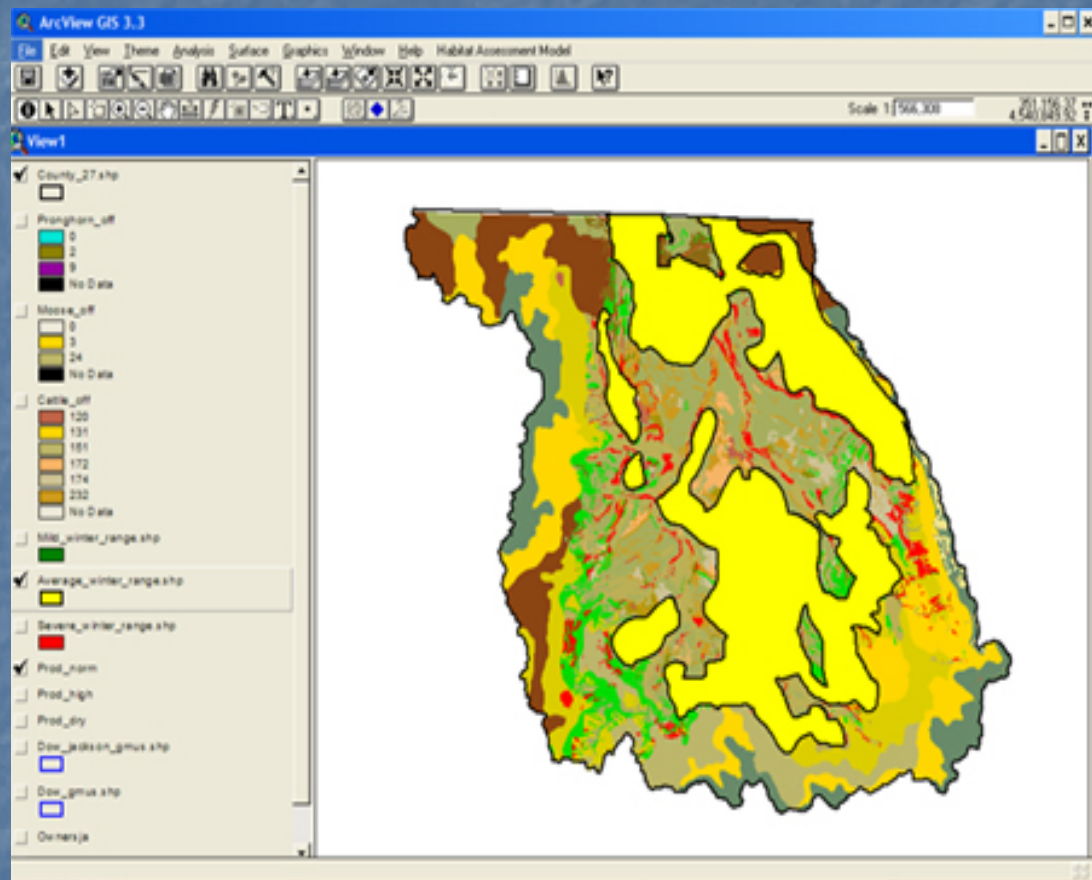
- Arcview Extension

- Model on CD with all data

- Manual

- Support from us for as long as you need it

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