

Joe Barsugli

CIRES and Western Water Assessment

University of Colorado at Boulder

Affiliated with NOAA Earth System

Research Lab/ Physical Sciences Division

The “Uncertainty Prayer”

Grant us...

The ability to reduce the uncertainties
we can;

The willingness to work with the
uncertainties we cannot;

And the scientific knowledge to know
the difference.

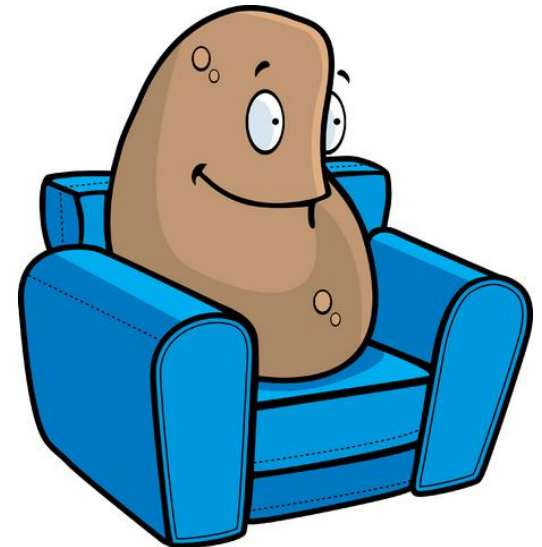
Three Camps

Decision-Makers (“Wallet Holders”)

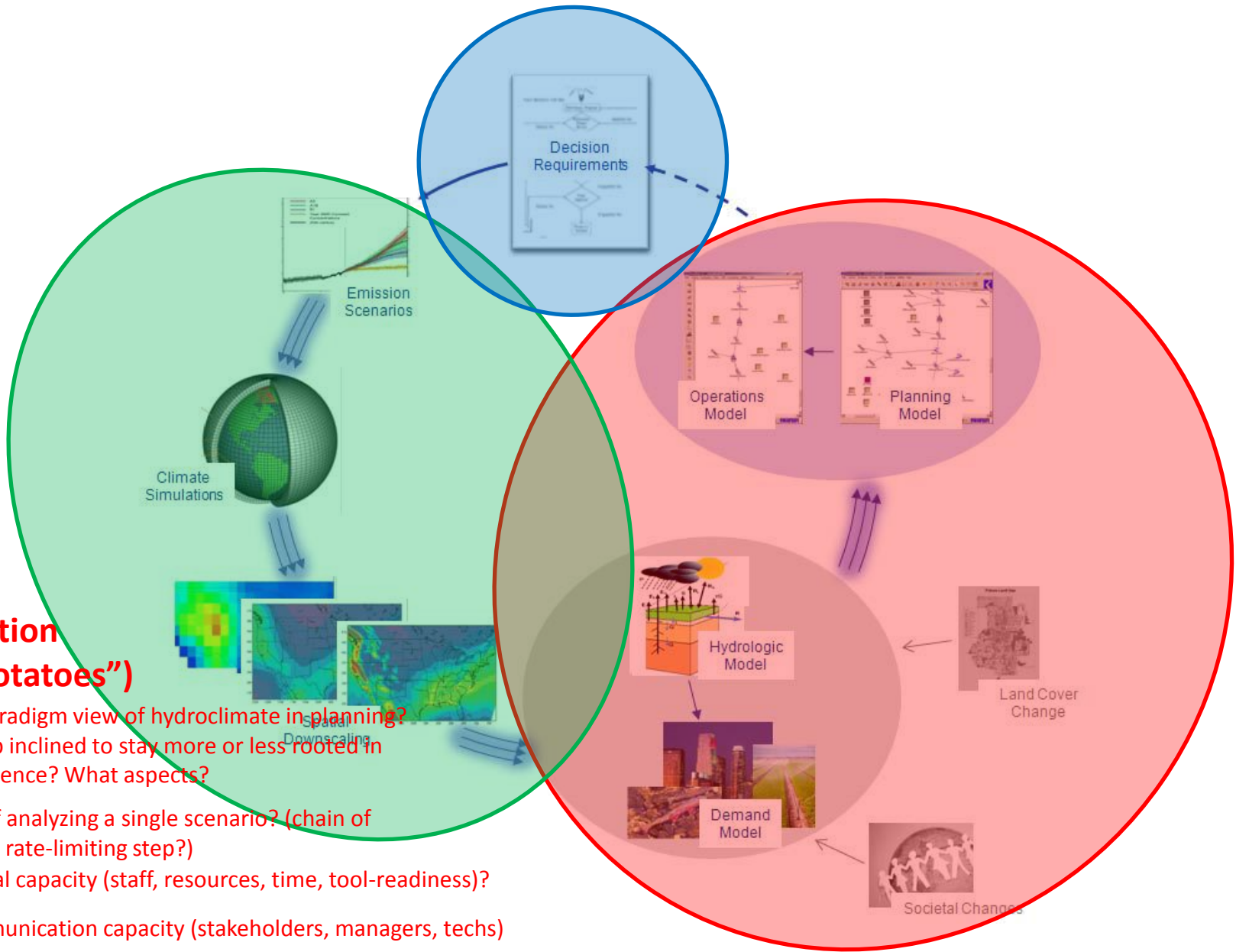


Climate Information Providers (“Science Geeks”)

Translators and Planning Participants (“Couch Potatoes”)



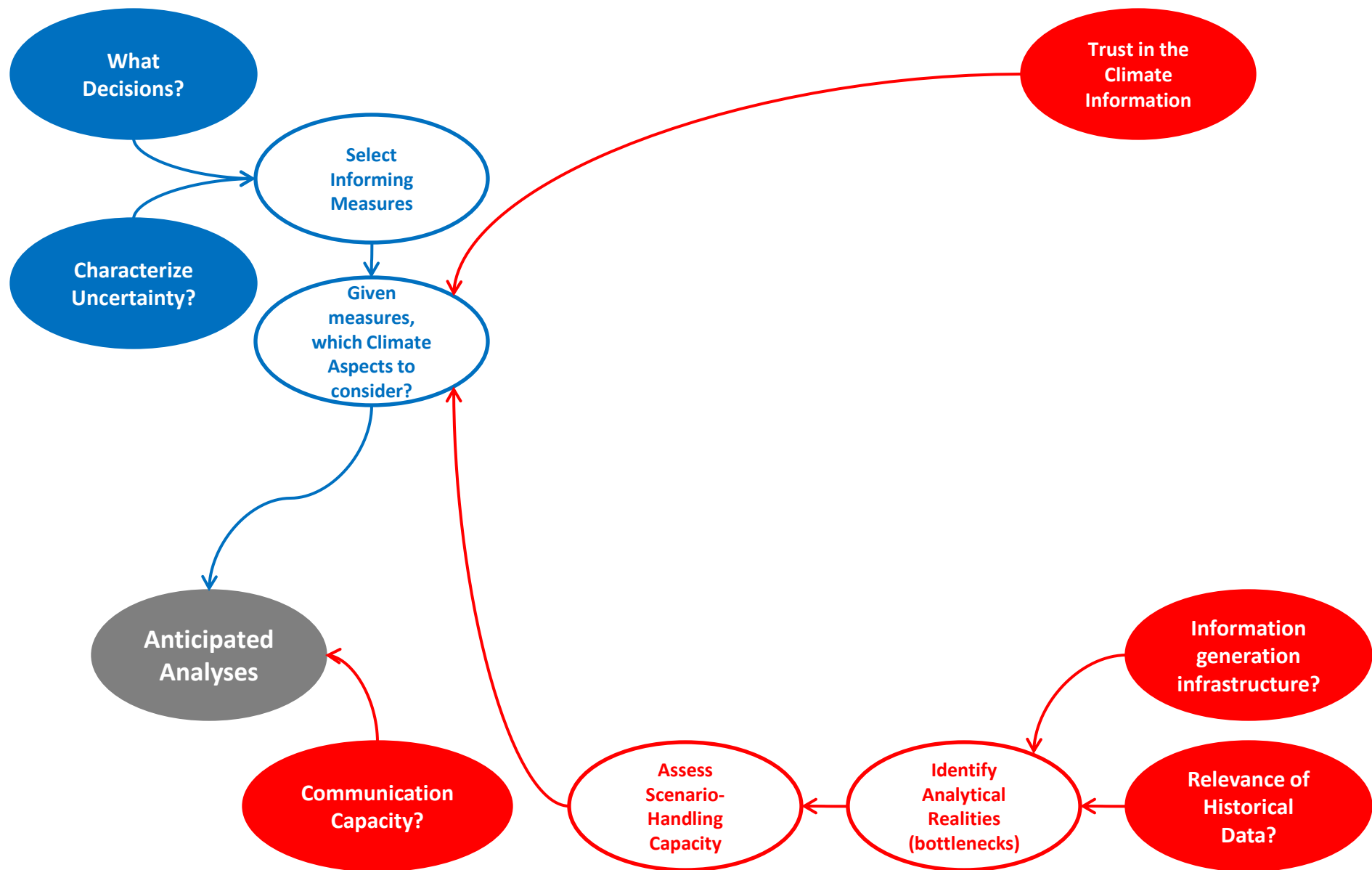
...because we couch the climate science...



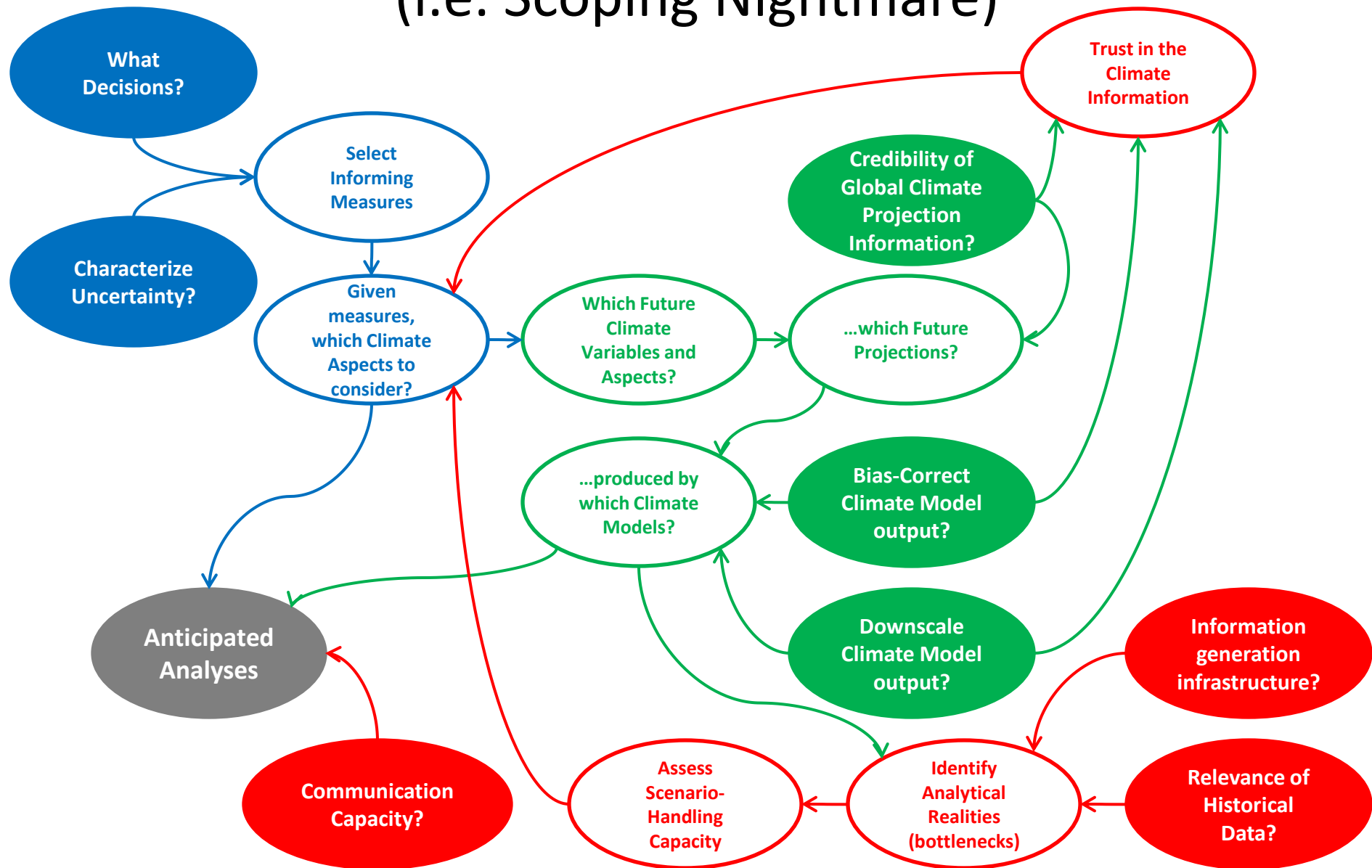
III. Translation (“Couch Potatoes”)

- a. Regard for paradigm view of hydroclimate in planning? (i.e. Is the group inclined to stay more or less rooted in historical experience? What aspects?)
- b. Realities of analyzing a single scenario? (chain of analyses, and rate-limiting step?)
- c. Analytical capacity (staff, resources, time, tool-readiness)?
- d. Communication capacity (stakeholders, managers, techs)
- e. Attitudes about Credibility required for Climate Information? (decision-makers, stakeholders, managers, techs)

Influence Diagram – without Projected CC



Influence Diagram – with Projected CC (i.e. Scoping Nightmare)



To get past this choice point you must answer these (three) questions

Premise: Climate model biases will introduce biases into impacts (e.g. hydrologic) models

Trust in Climate Info

- Do we find using GCM output credible to determine our baseline?
- Do we find using **only** the mean changes from GCMs credible (->no BC; go to change-factor methods)
- Are GCM biases small enough that we can defer bias correction decision to the impacts model? ...

Bias-Correct
Climate Model
output?

yes

- Model output during historical period comparable to historical observations in the metrics used for BC.
- Correlations among model variables may not be maintained by BC; processes may be distorted
- Bias correction introduces additional methodological uncertainty
- ...

no

- Physical relationships among model variables maintained; processes consistently represented
- Water and energy budgets balanced at space/time scales of model
- GCM biases may be large and may lead to large discrepancies in impacts (e.g. hydrologic) models for the historical period.



National Climate Predictions and Projections Platform (NCPP)

- Focused on the synthesis of existing climate capabilities spread across federal agencies, regional and local governments, universities, **professional societies**, nonprofits, and commercial activities
- Community participation in development of capabilities and problem solving
 - Evolving governance structure → based on open-source, open-innovation principles

Evaluation of Local and Regional Scale Projections

- Statistical and dynamical downscaling
- Three “Protocols”
 - Comparison to observations using standardized test suite
 - “Perfect model” – tests of nonstationarity in statistical downscaling using multi-resolution global simulations
 - Idealized tests (simple cases or analytical solutions)
- Evaluation Metrics
 - Basic error statistics (RMSE, correlation, ...)
 - Statistics on extremes
 - Sector-specific metrics
- Workshop in Summer 2013 with scientists and practitioners
- Learn from and collaborate with EU programs

Metadata : Context

- Develop metadata language
 - Describe downscaling methods
 - Describe quantitative evaluation and metrics
 - Allow qualitative information
- Document “provenance” of the data
 - Traceable chain of analysis
 - Quality information at each step
- Communicate information clearly
 - Ingredients
 - Nutrition Facts

Nutrition Facts				
Serving Size 1 cup (228g)				
Servings Per Container 2				
Amount Per Serving				
Calories	250	Calories from Fat 110		
% Daily Value*				
Total Fat	12g		18%	
Saturated Fat	3g		15%	
Trans Fat	3g			
Cholesterol	30mg		10%	
Sodium	470mg		20%	
Total Carbohydrate	31g		10%	
Dietary Fiber	0g		0%	
Sugars	5g			
Protein	5g			
Vitamin A			4%	
Vitamin C			2%	
Calcium			20%	
Iron			4%	
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.				
		Calories	2,000	2,500
Total Fat	Less than	65g		80g
Sat Fat	Less than	20g		25g
Cholesterol	Less than	300mg		300mg
Sodium	Less than	2,400mg		2,400mg
Total Carbohydrate		300g		375g
Dietary Fiber		25g		30g