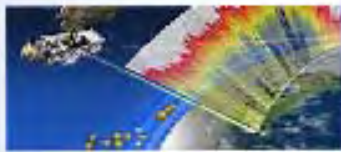


US EPA ARCHIVE DOCUMENT



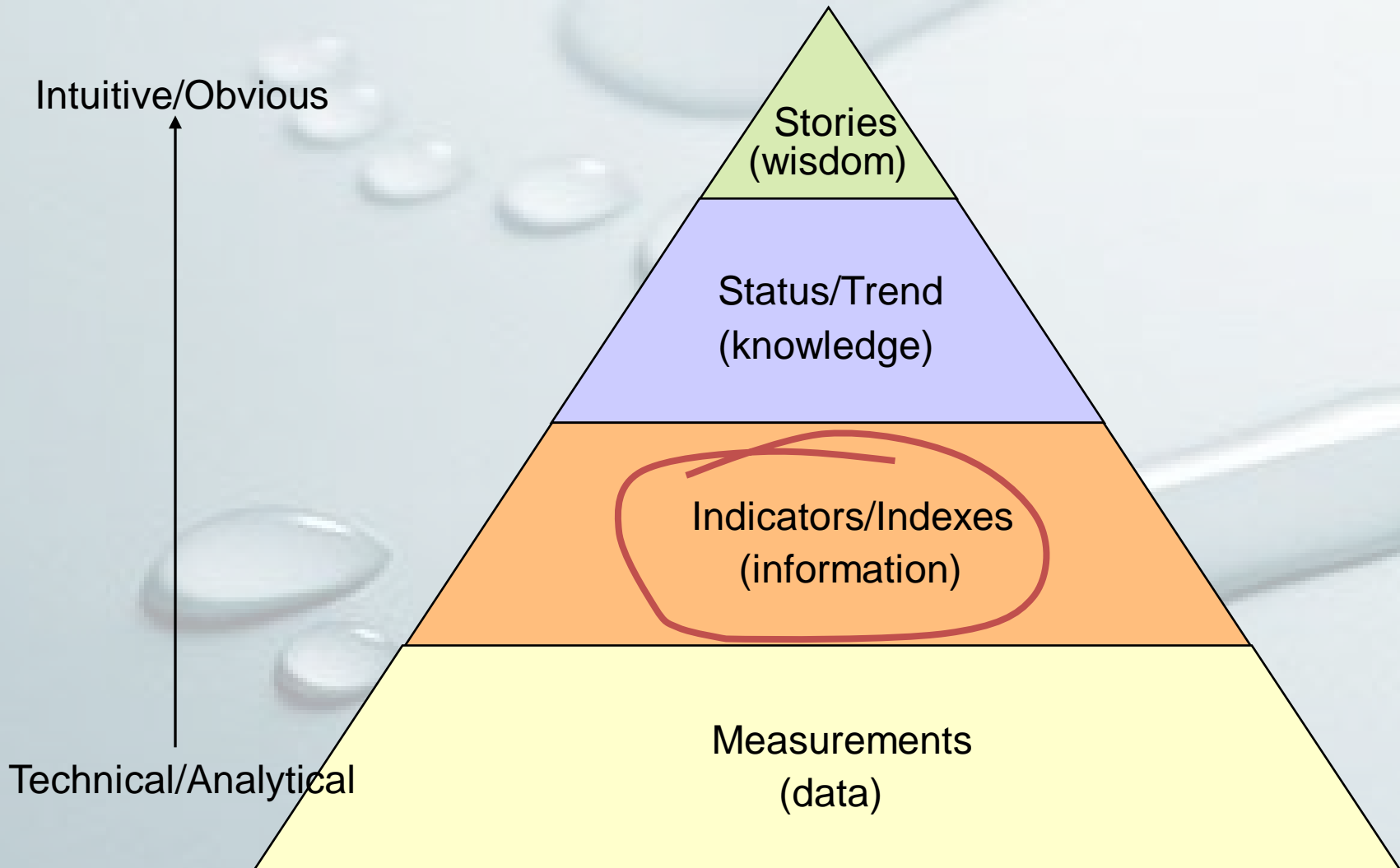
California Footprint – Sustainability Indicators



Vance Fong – Don Hodge – Sarah Rizk
U.S. Environmental Protection Agency
The Pacific Southwest Region

Information Pyramid

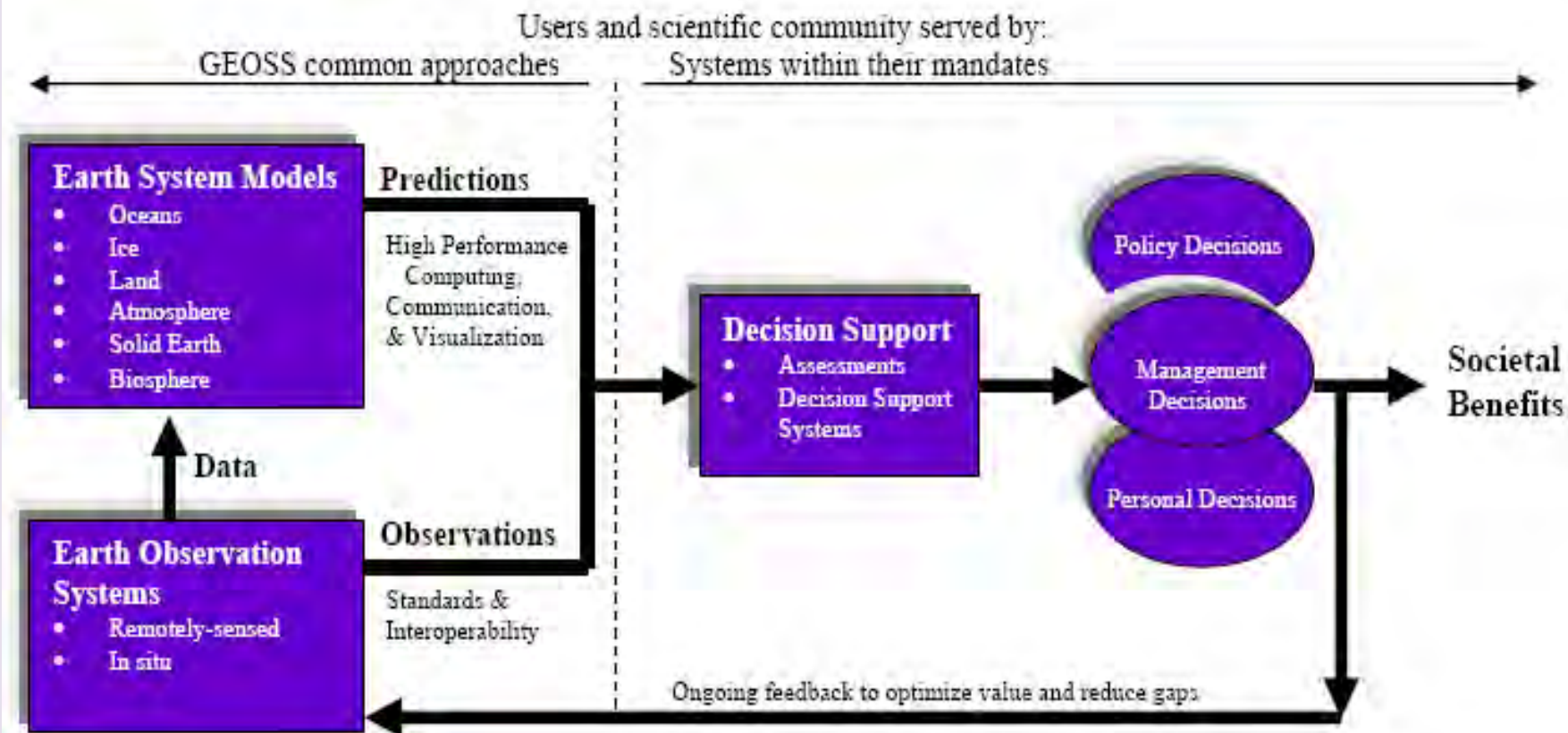
DWR Water Sustainability Indicators



Linking Earth Observations to Societal Benefits

“I am thrilled with the promise of GEOSS. It can provide us with better information to use in decision-making, producing better decisions that are better informed with more data points. I hope to help make the promise of GEOSS a reality.”

- Ex EPA Administrator Steve Johnson



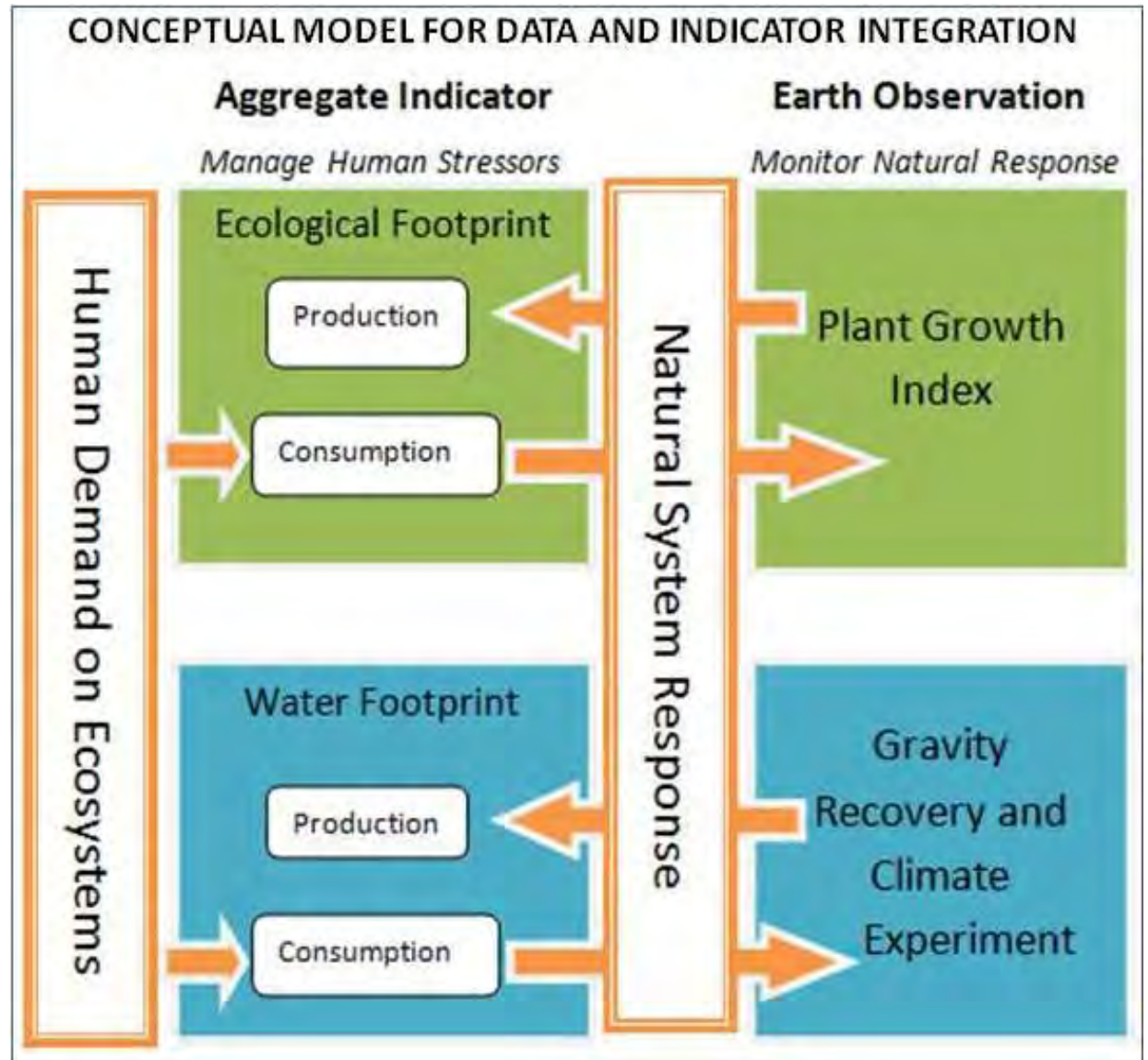
Ecological Footprint

compares the population's use of natural resources with the nature's ability to provide those resources.

Water Footprint compares available sources with uses of freshwater.

Plant Growth Index (PGI), based on earth observation data, measures plant communities' response to stressors.

Gravity Recovery and Climate Experiment (GRACE) is an indicator of groundwater flux based on earth observation data.



California Sustainability Indicators: Decision Support Tools for Resource Management



Ecological Footprint

Data gathering
Input into model

*Use Footprint to
inform policy*



Plant Growth Index

Processed Data
from NASA/NOAA

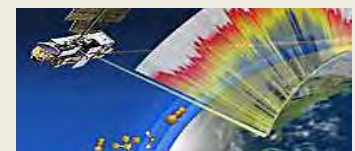
*Using models to
connect with
Eco & H₂O
footprints*



Water Footprint

Data gathering
Input into model

*Use Footprint to
inform policy*

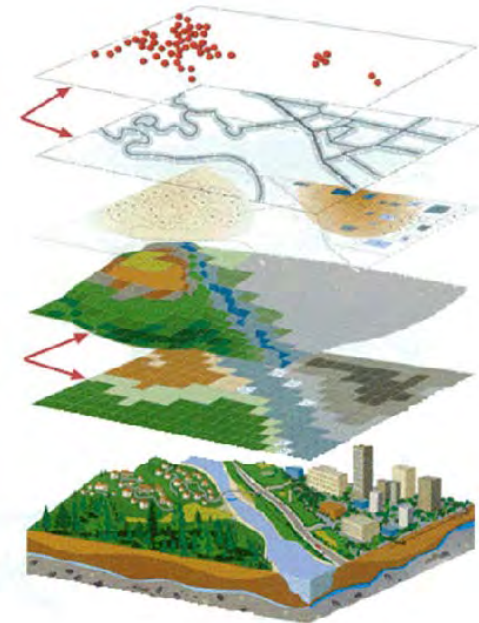


GRACE

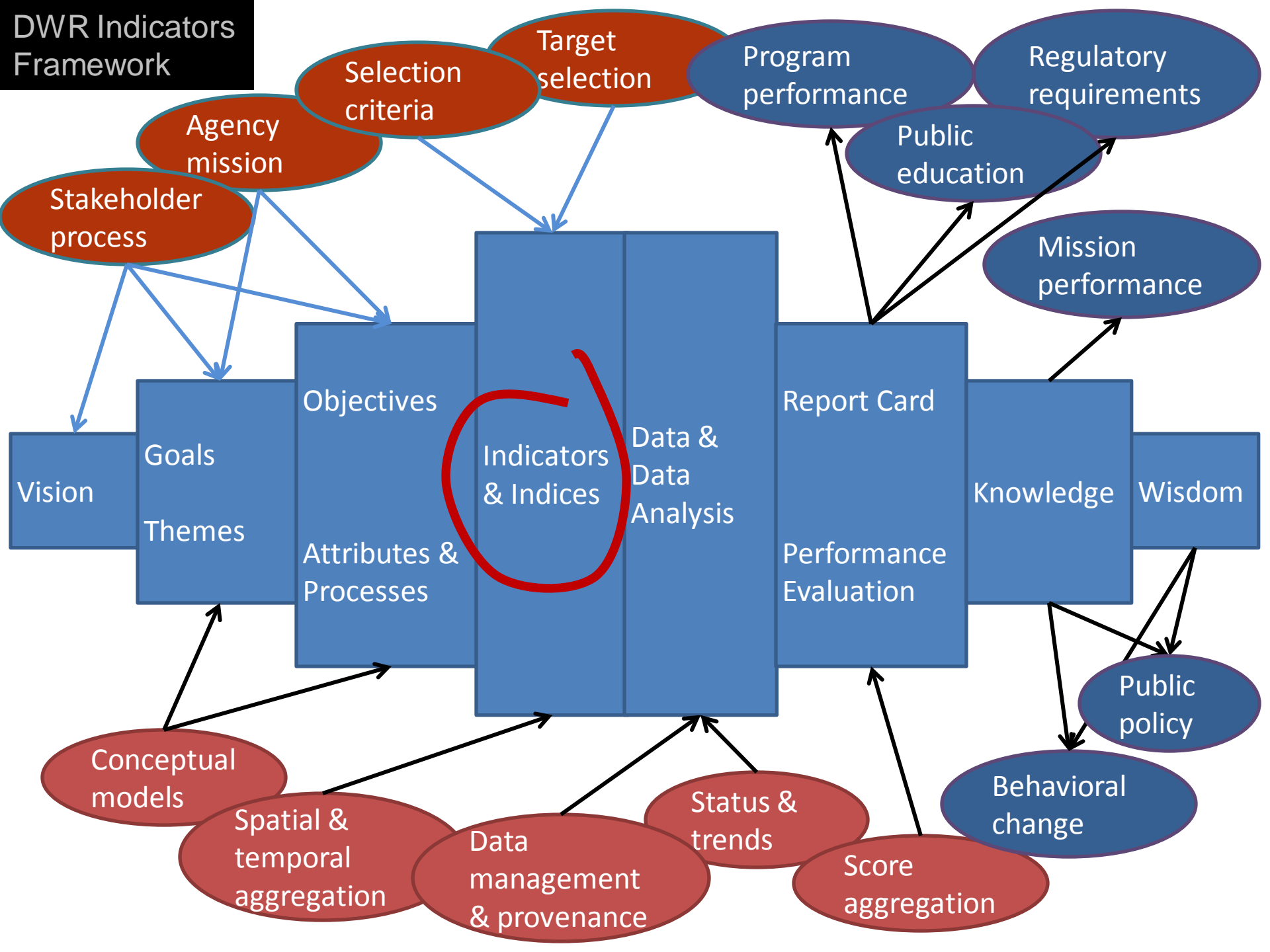
Processed Data
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*Using models to
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Eco & H₂O
footprints*

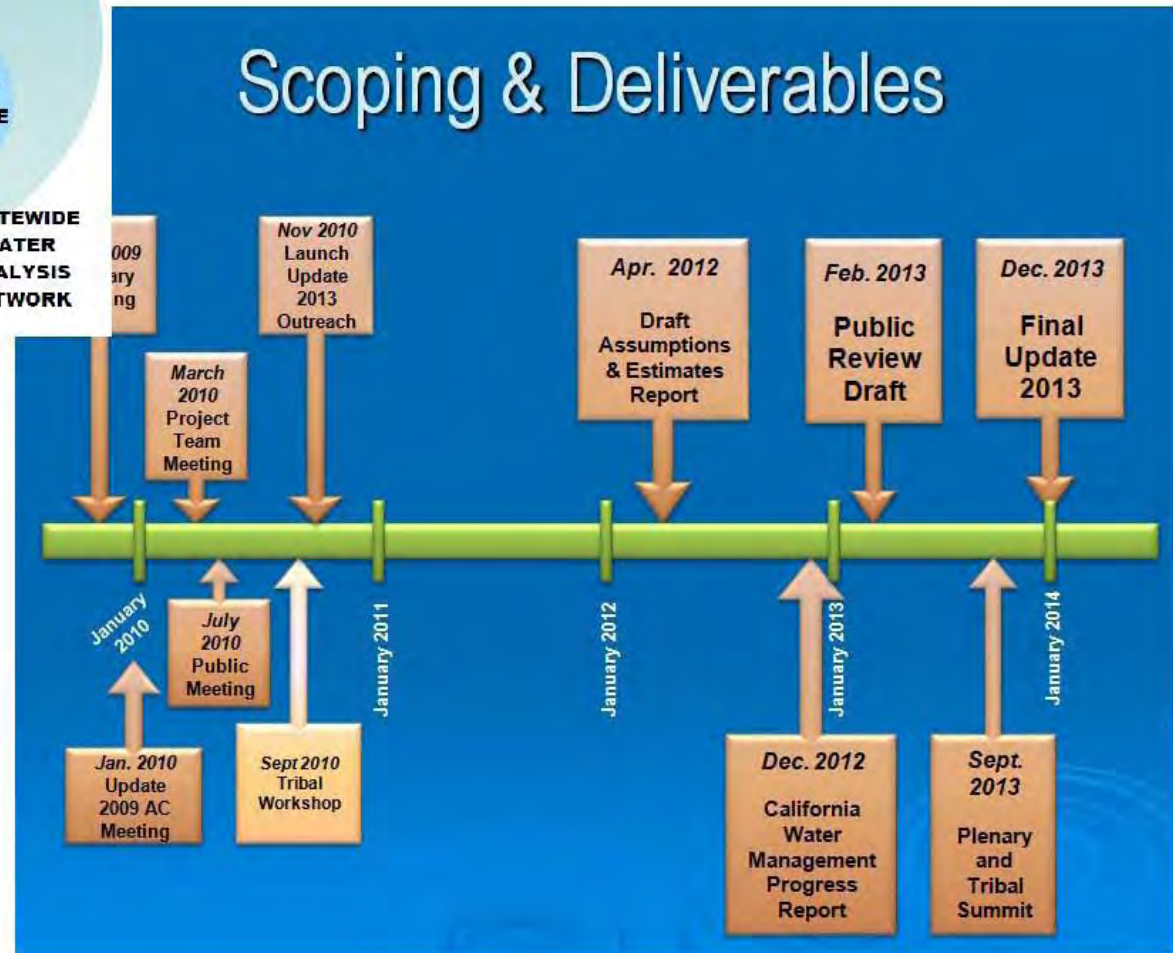
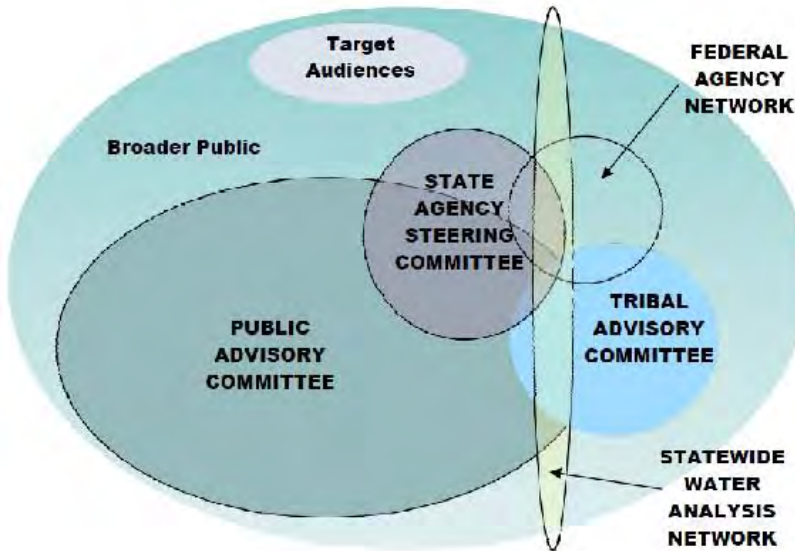
Indicators



DWR Indicators Framework



California Water Plan 2013 Update



Footprints: Resource Accounting Models

Biocapacity:

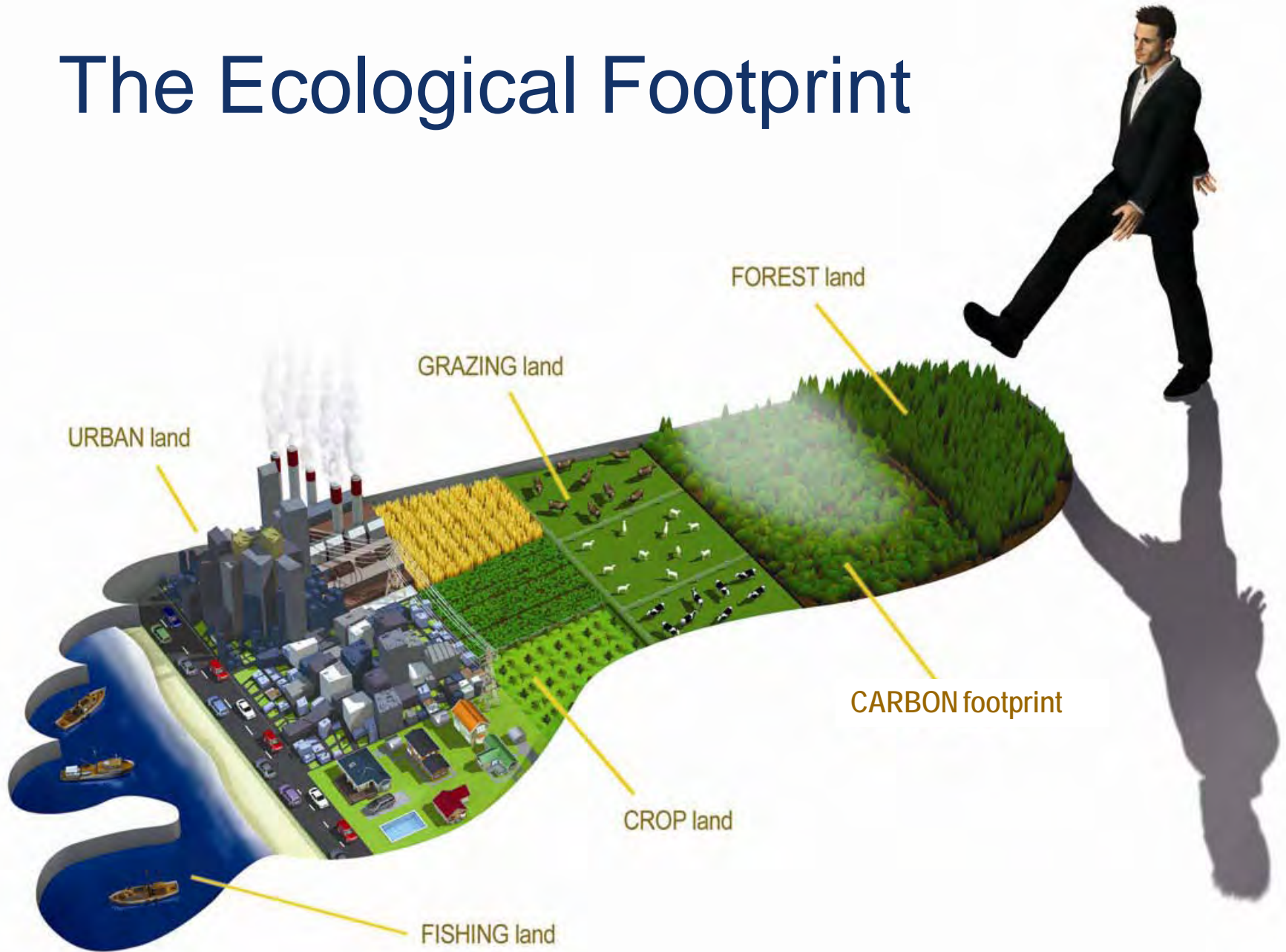
How much bioproductive area is **available to us**?



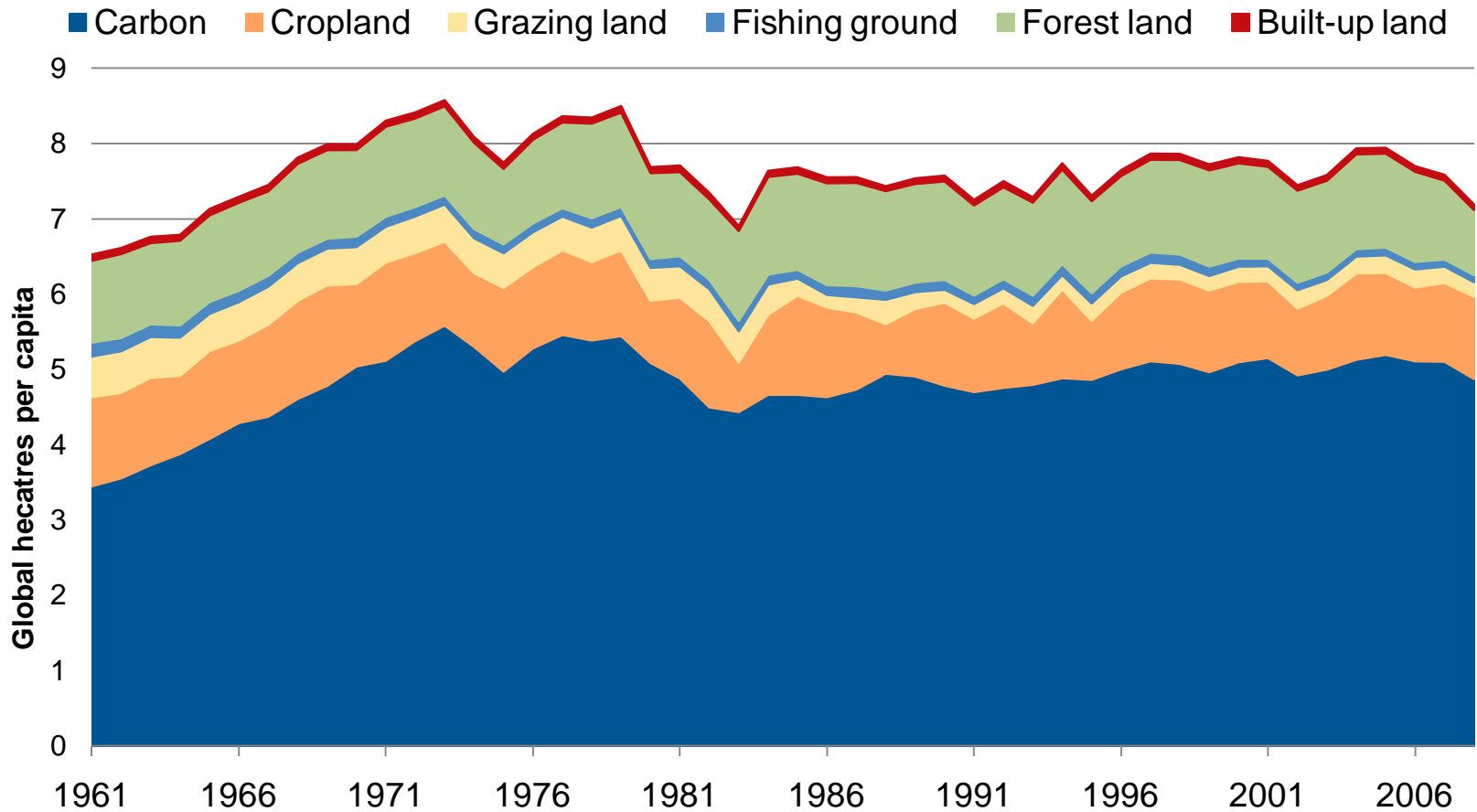
Ecological Footprint:

How much bioproductive area do we **demand**?

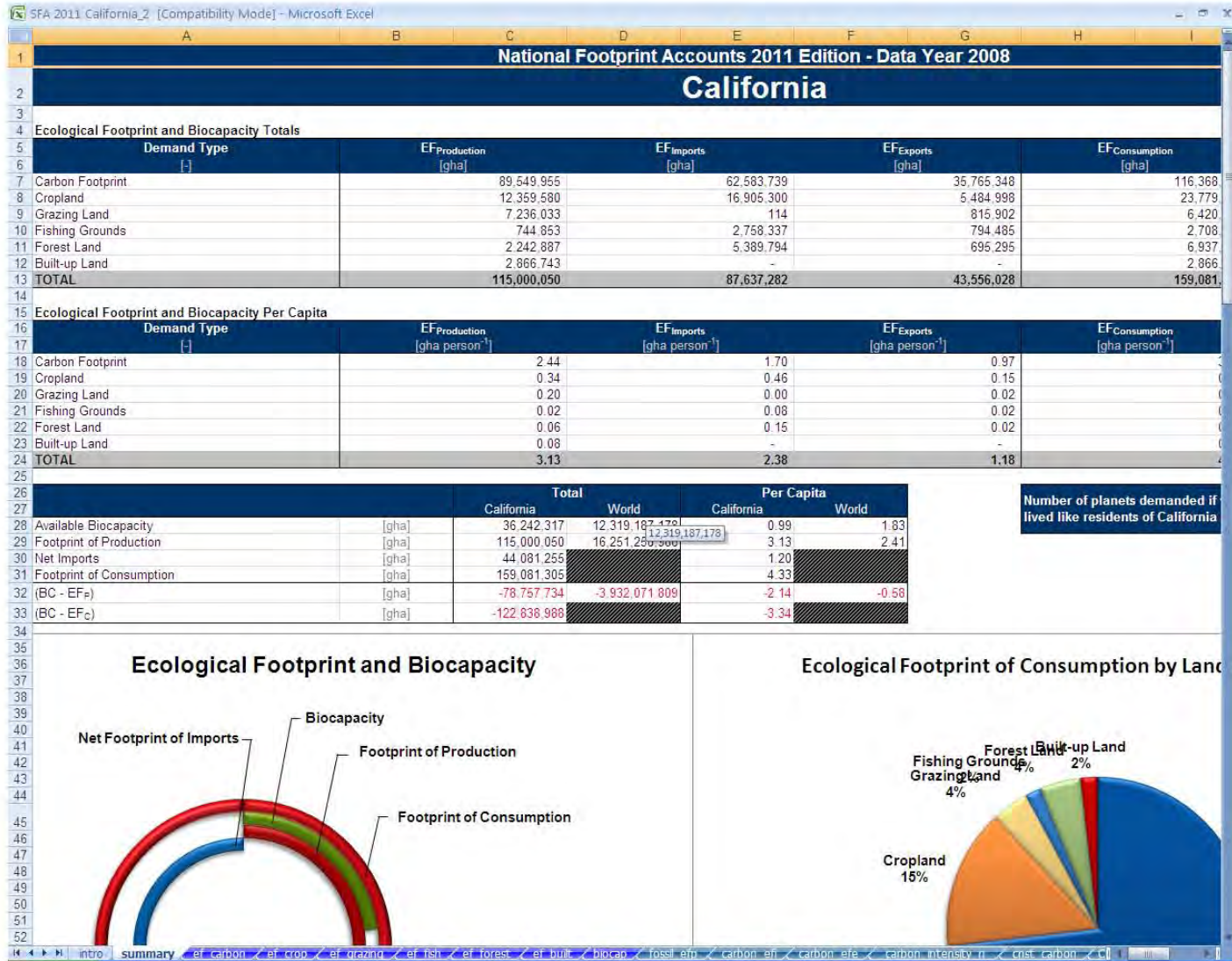
The Ecological Footprint



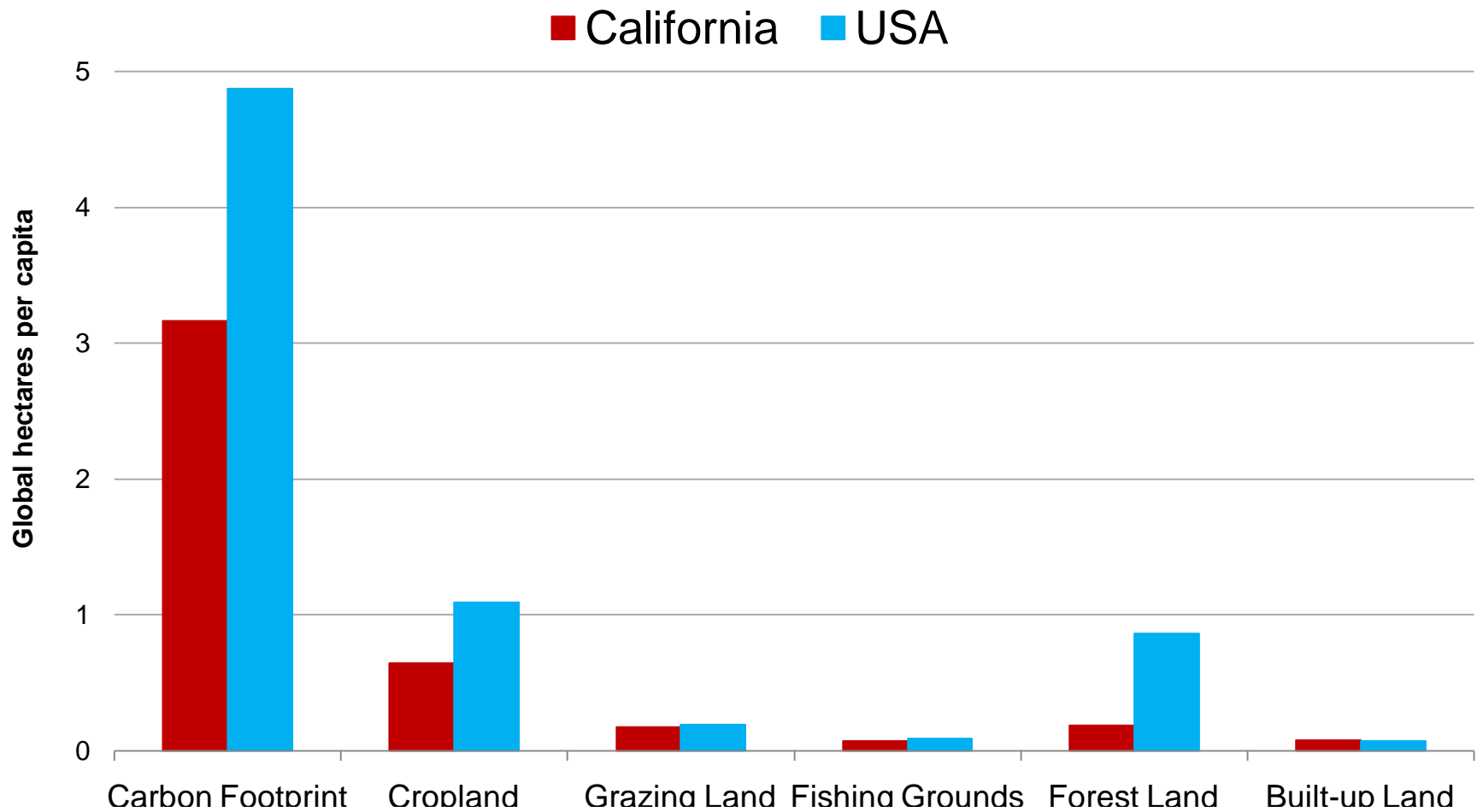
United States of America



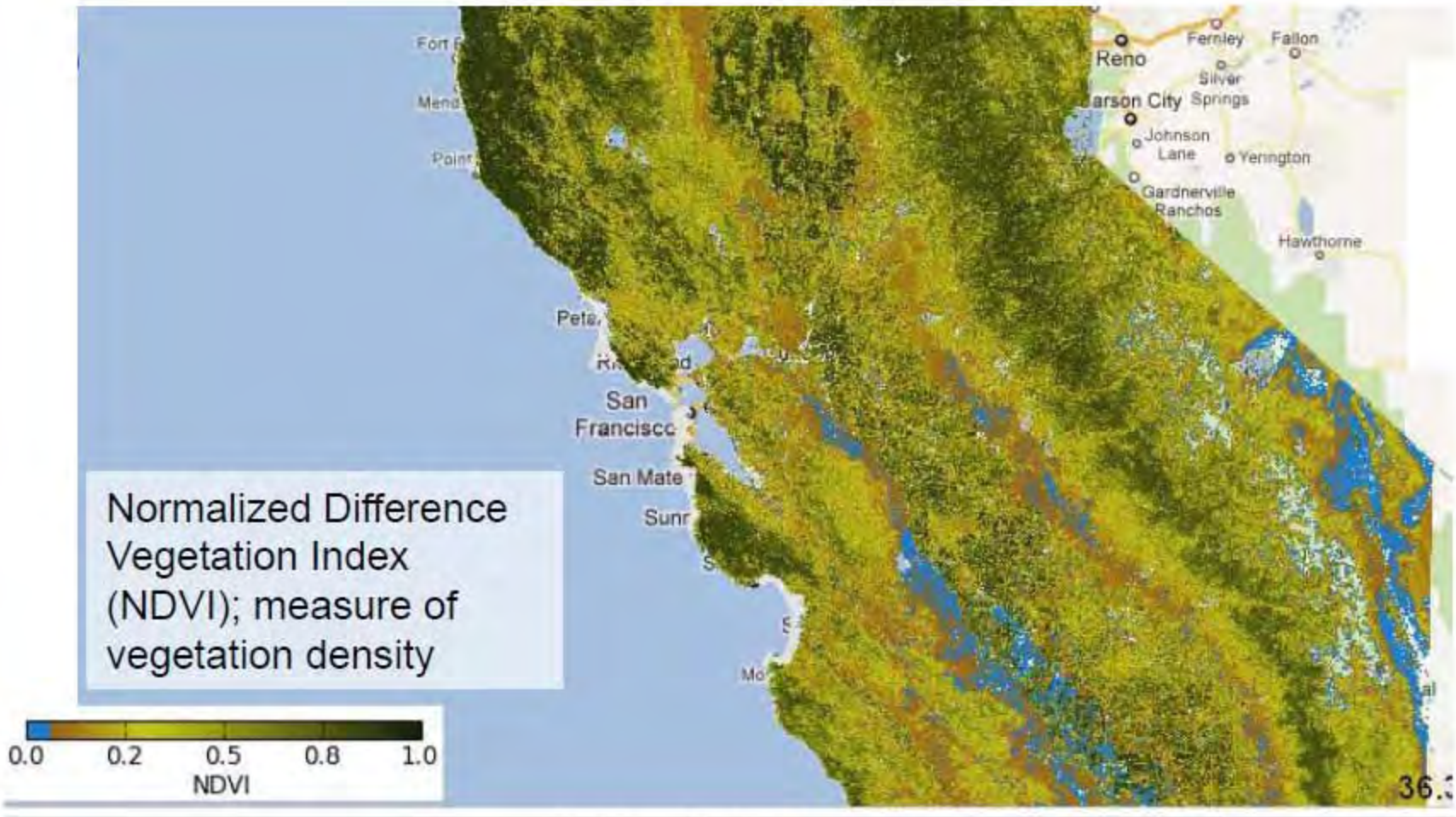
Ecological Footprint summary data



California Ecological Footprint Analysis: Preliminary Results



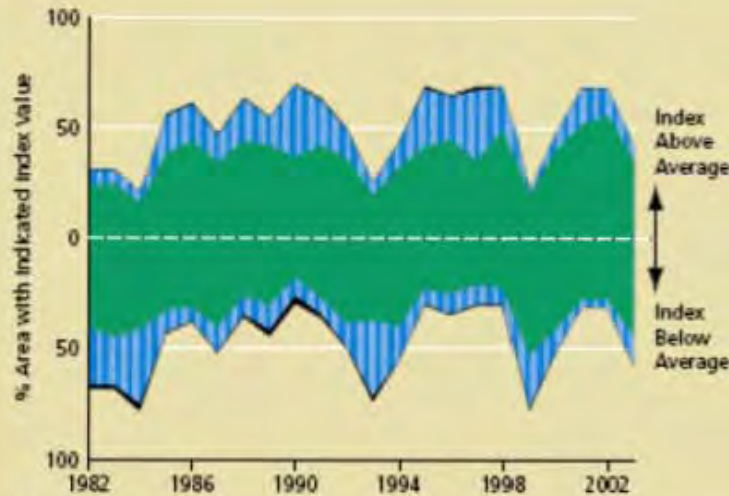
NDVI map



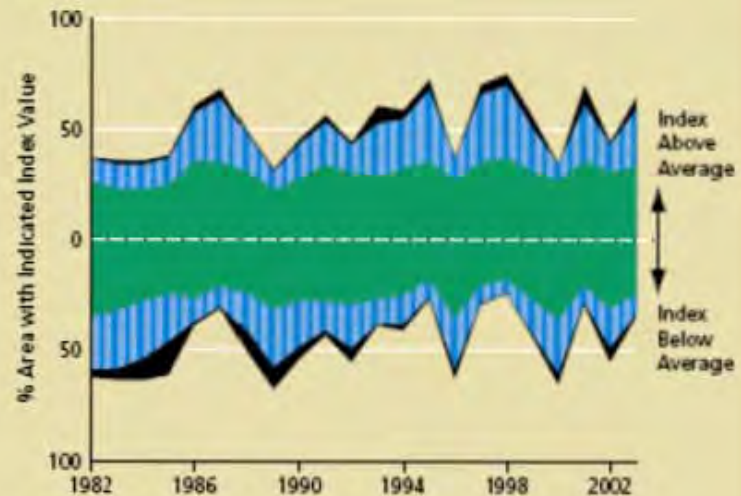
Plant Growth Index: Summarizing Patterns by Ecosystem Type

Ecosystem Area with Increasing or Decreasing Plant Growth Index

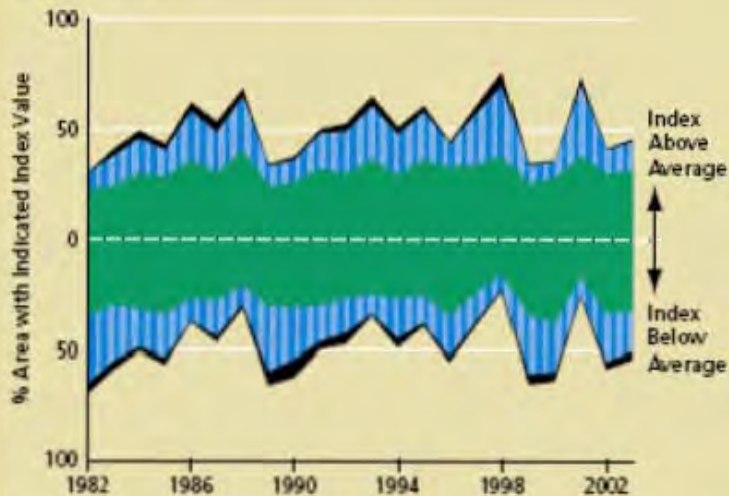
Forests



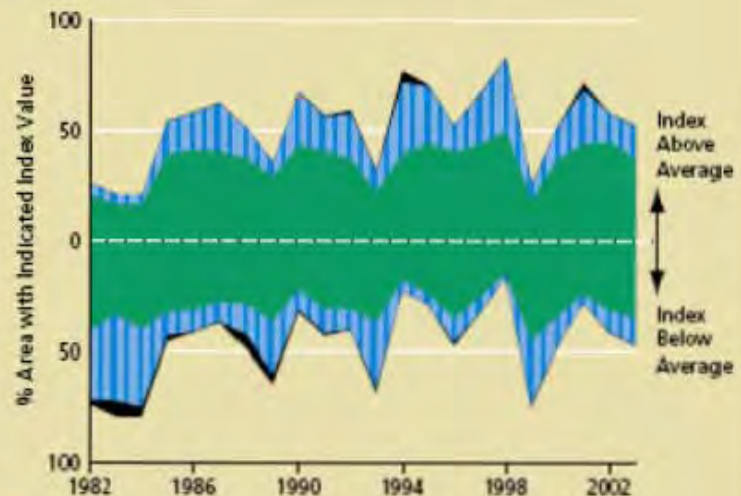
Grasslands



Shrublands



Croplands



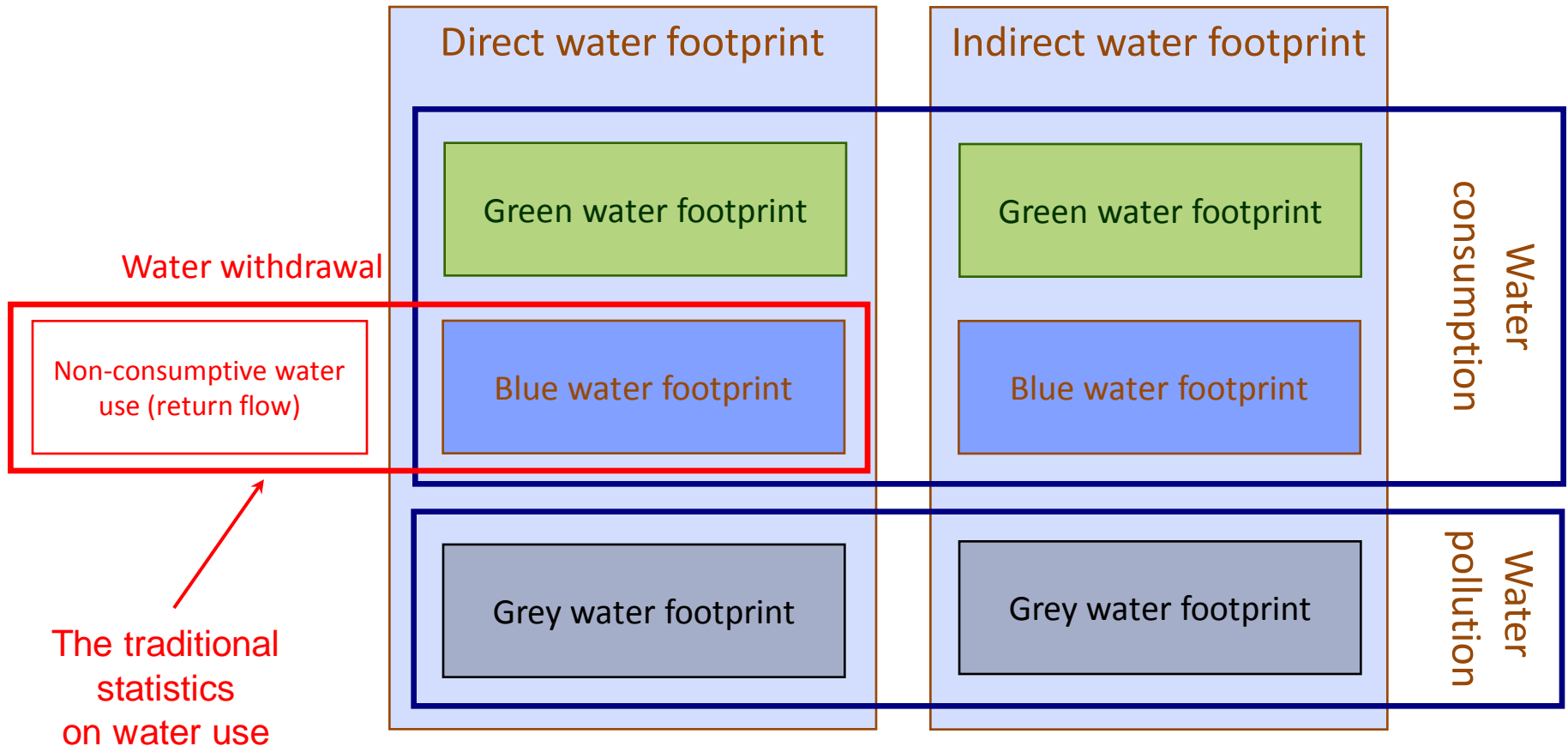
Index Relative to Average for 1982-2003

-
 0 to 0.02
 -
 0.02 to 0.05
 -
 more than 0.5

Data source: NASA (analysis by Terrestrial Observation and Prediction System (TOPS)/Ames Research Center, NASA). Coverage: lower 48 states.

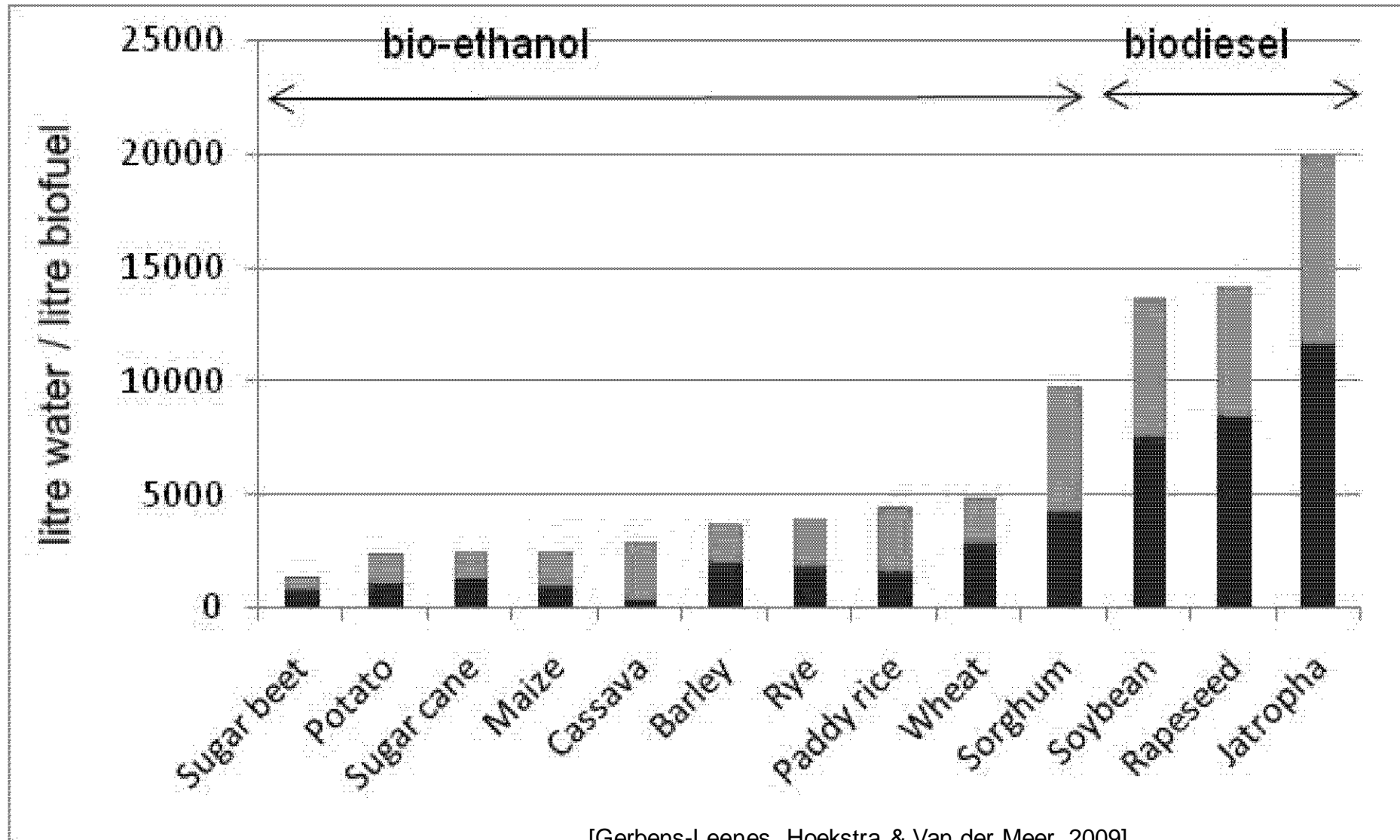


Water Footprint: Components

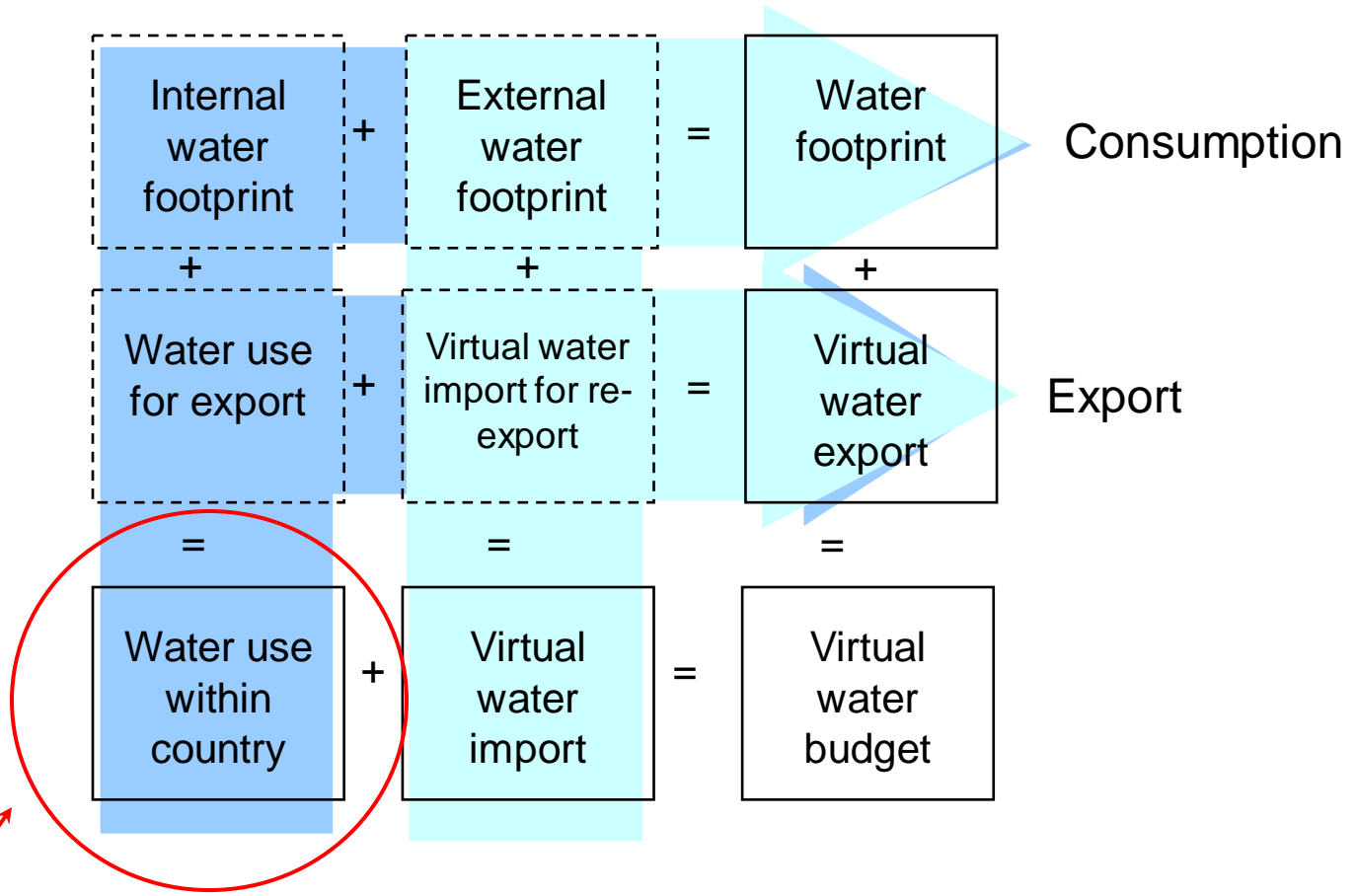




Water footprint of biofuels from different crops [litre/litre]



Water accounting framework for geographic areas



The traditional statistics on water use

Production

Import

Irrigation requirement



Irrigation requirement = crop water requirement – effective rainfall

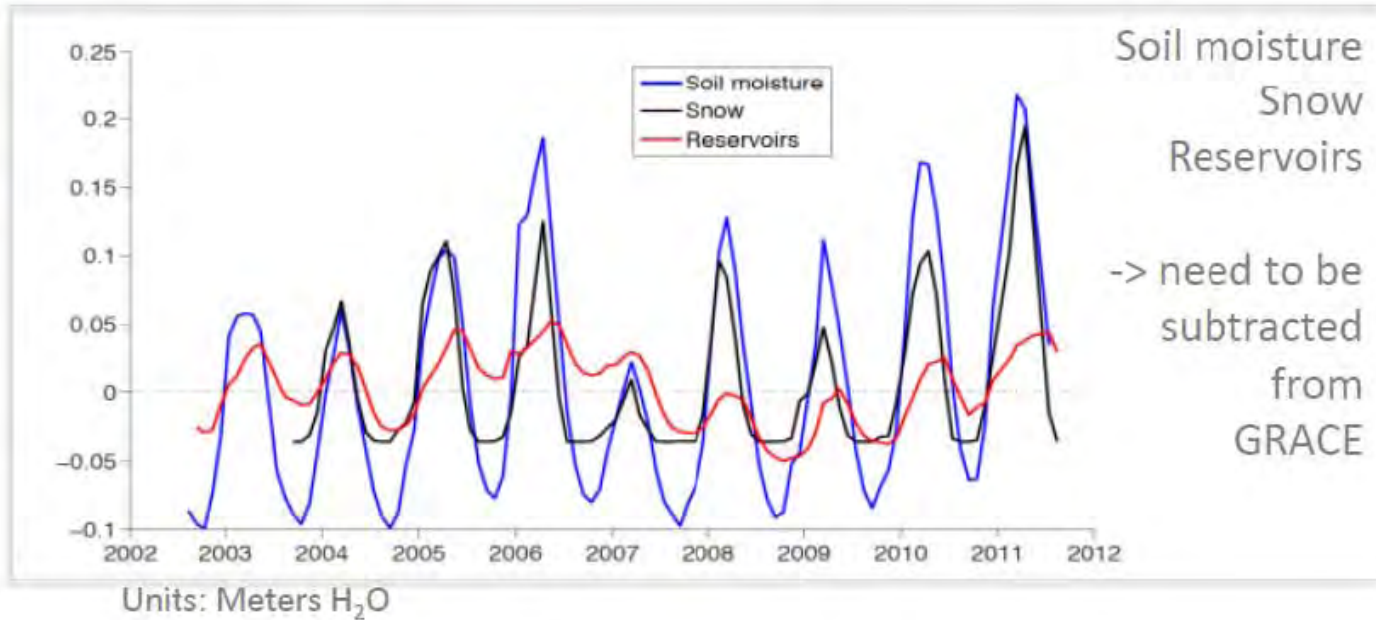
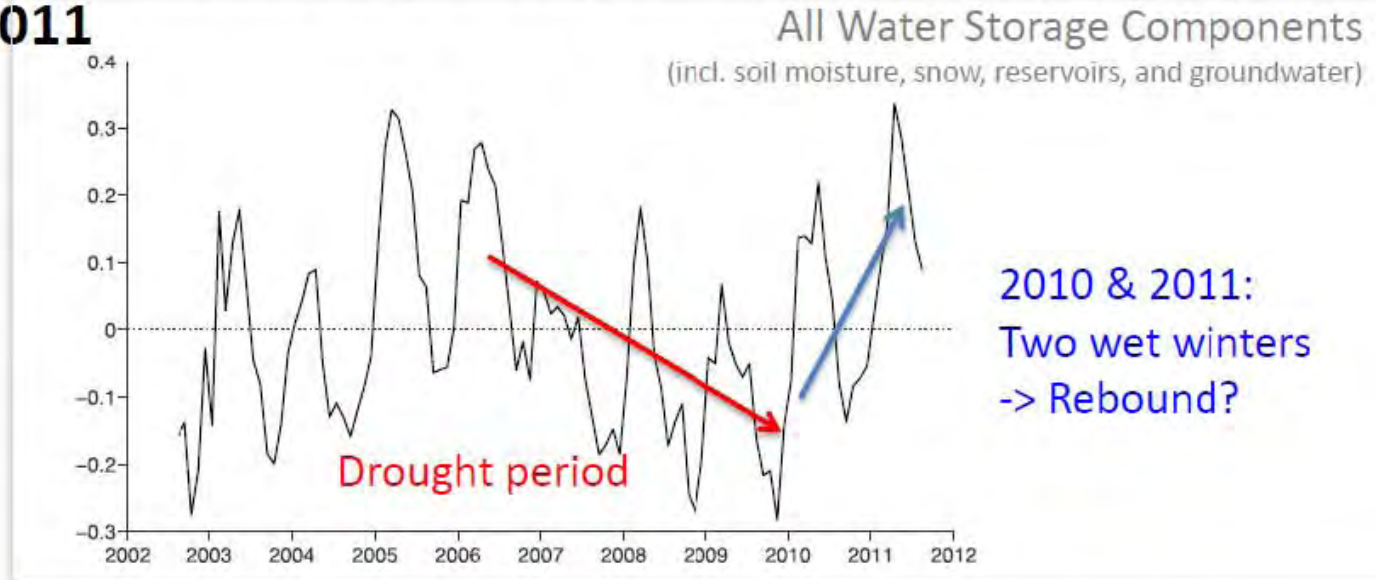


National Aeronautics and Space Administration
 Jet Propulsion Laboratory
 California Institute of Technology
 Pasadena, California

California's Central Valley: Terrestrial Water Storage changes measured from GRACE 2003 - 2011

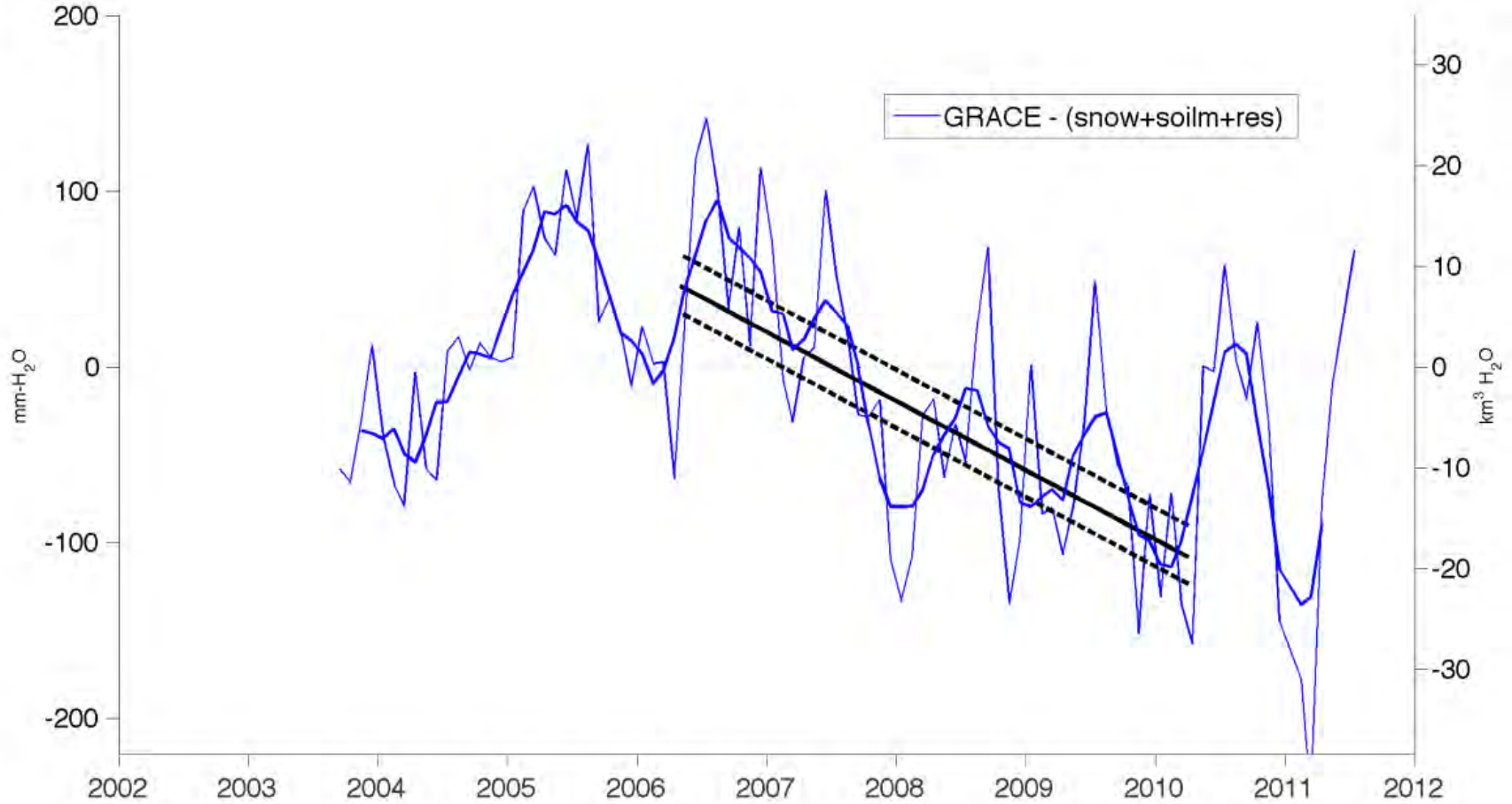


Map from Famiglietti et al., 2011



Units: Meters H₂O

Central Valley groundwater storage changes: GRACE



GRACE spatial view

Total water storage, California

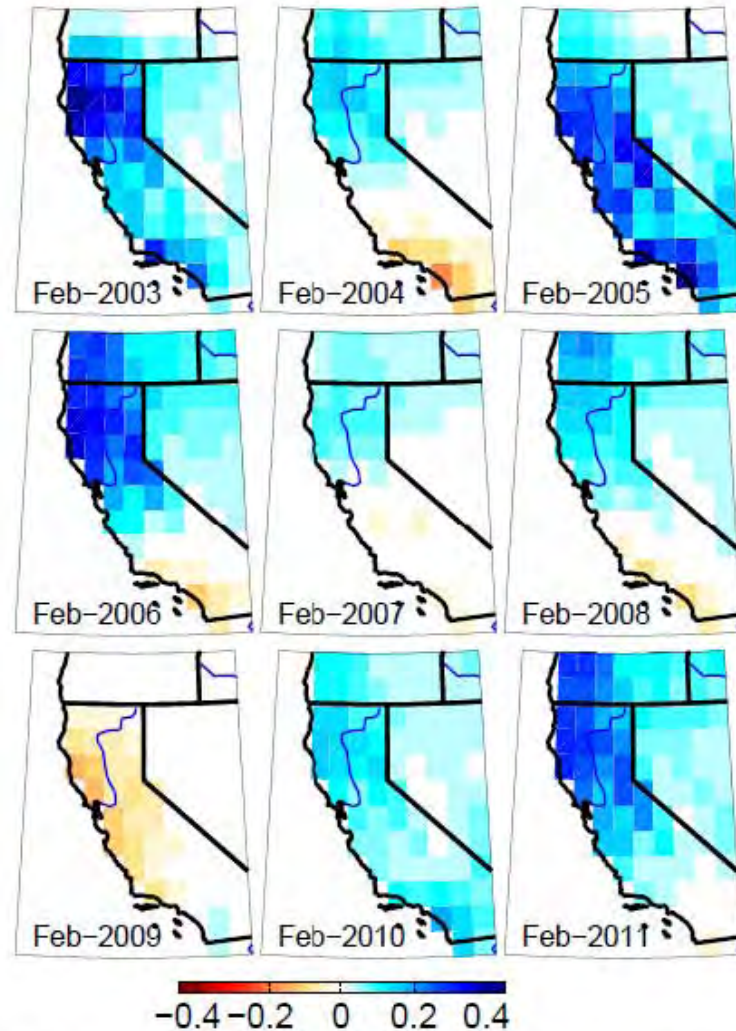


Figure 8: Total water storage anomalies for the month of February for the years shown. Units: $m H_2O$.

Contacts

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