Statewide Water Footprint Estimation

Concept, preliminary findings, and current research

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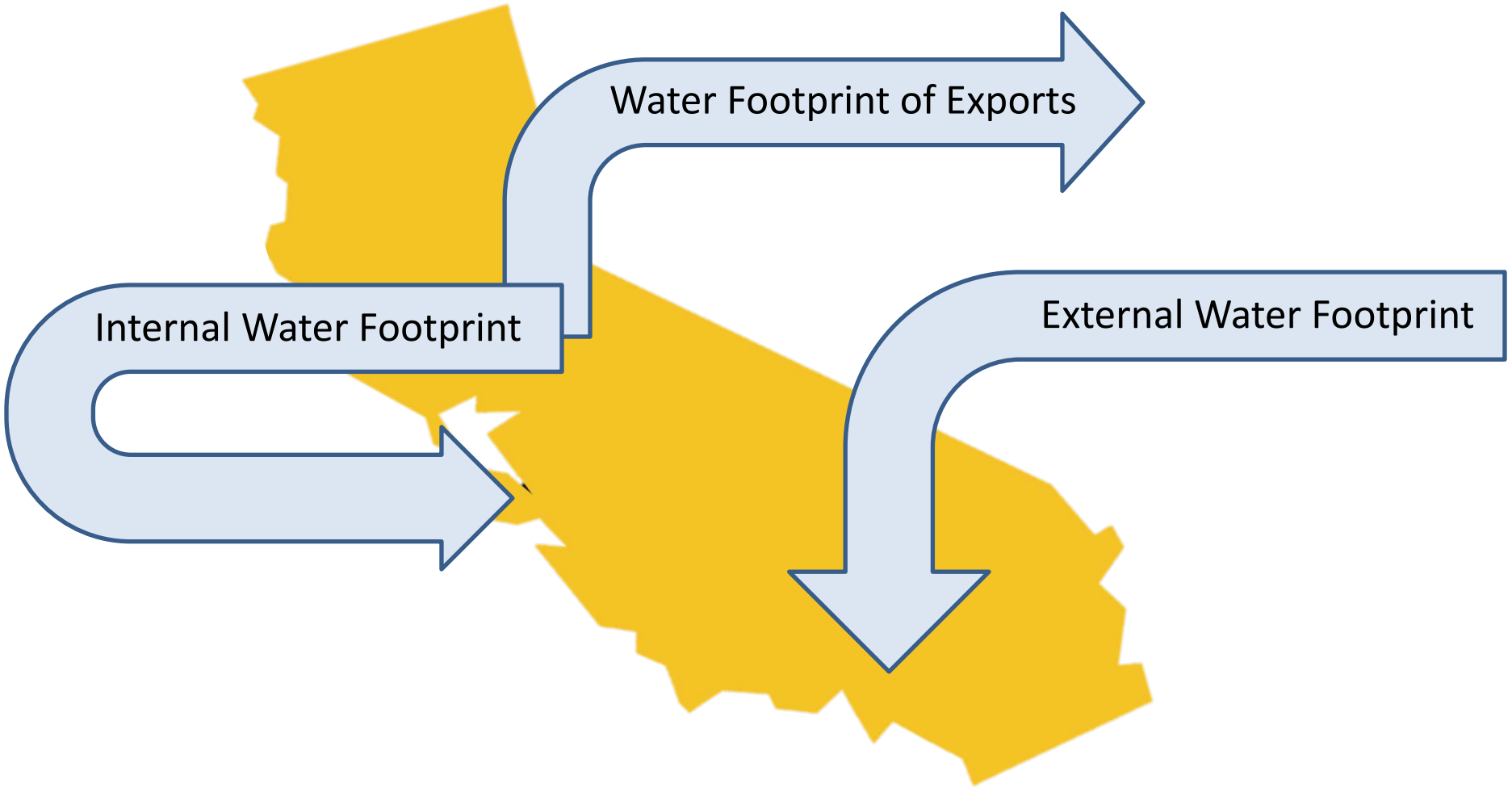
California Water Plan, Update 2013
Public Advisory Committee Meeting
February 14, 2013, 8:45AM- 4:30PM
Department of Public Health Services

25 YEARS PACIFIC INSTITUTE

Definitions

Term	Definition
Water footprint	The total volume of water consumed and needed to assimilate pollutants in the production of goods and services used by an individual or jurisdiction (e.g., state, country).
Internal water footprint (of consumption)	The portion of a jurisdiction's water footprint that originates from within that jurisdiction.
External water footprint (of consumption)	The portion of a jurisdiction's water footprint that originates from outside that jurisdiction.

Definitions



Water Footprint Components

Green water footprint

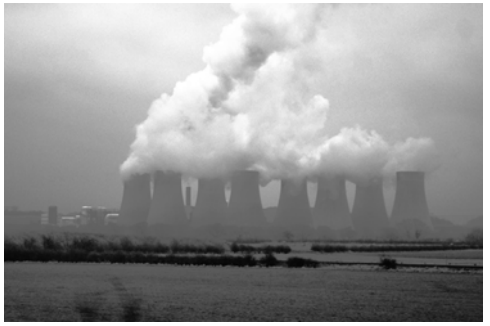
► volume of rainwater evaporated

Blue water footprint

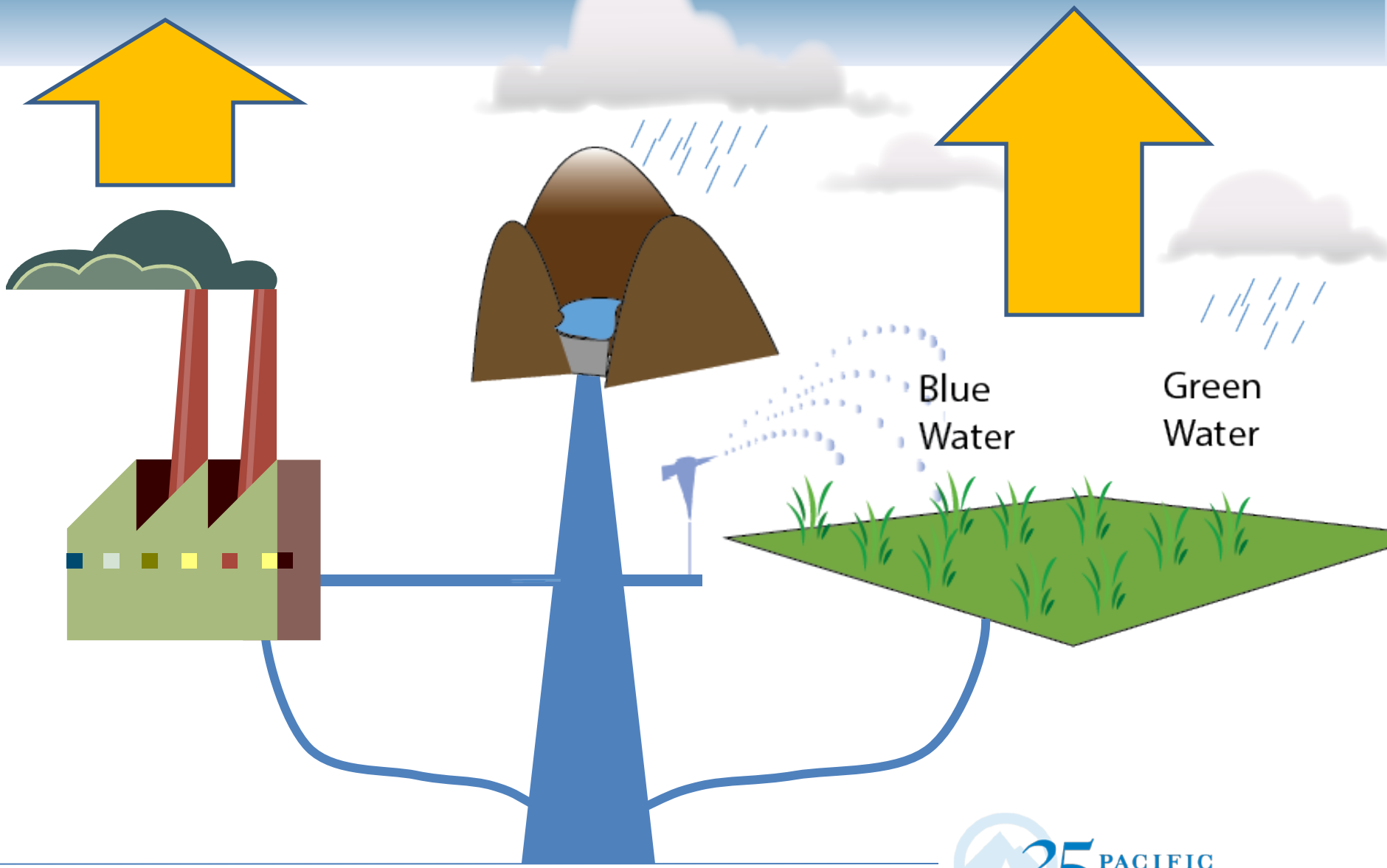
► volume of surface or groundwater evaporated

Grey water footprint

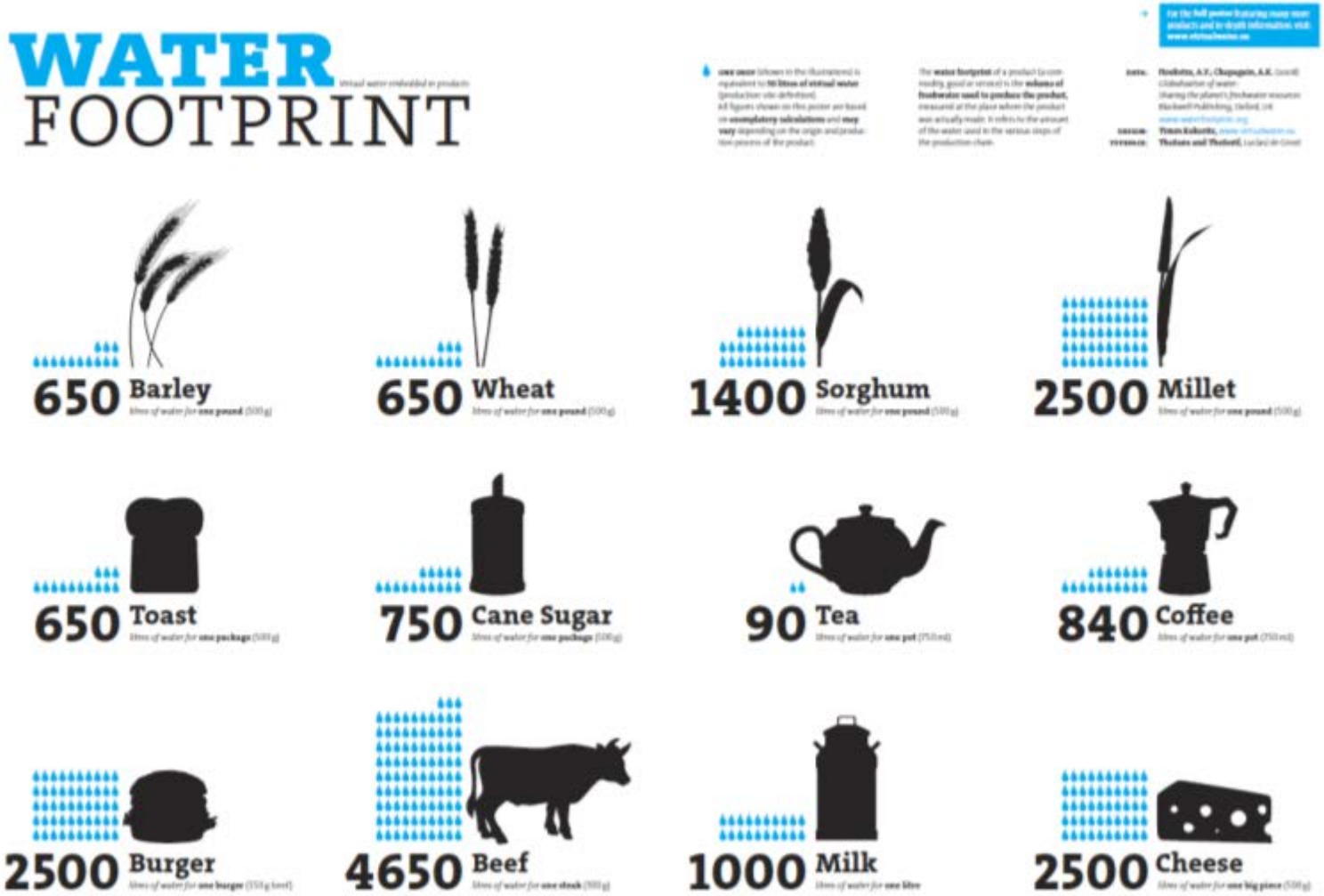
► volume of polluted water.



Consumptive Use



Examples



Source: http://virtualwater.eu/

Methods

- Accounting Framework:

Internal water footprint			+	External water Footprint	=	
Water footprint of goods and services produced in California	-	Water footprint of goods produced in California and exported	+	Water footprint of goods imported and consumed in California	=	Total water footprint of goods consumed in California

- Includes agricultural and industrial goods and residential, commercial and, institutional direct uses
- 3 components: **Green, Blue,** and **Grey**
- Target Year: 2007

Data Sources

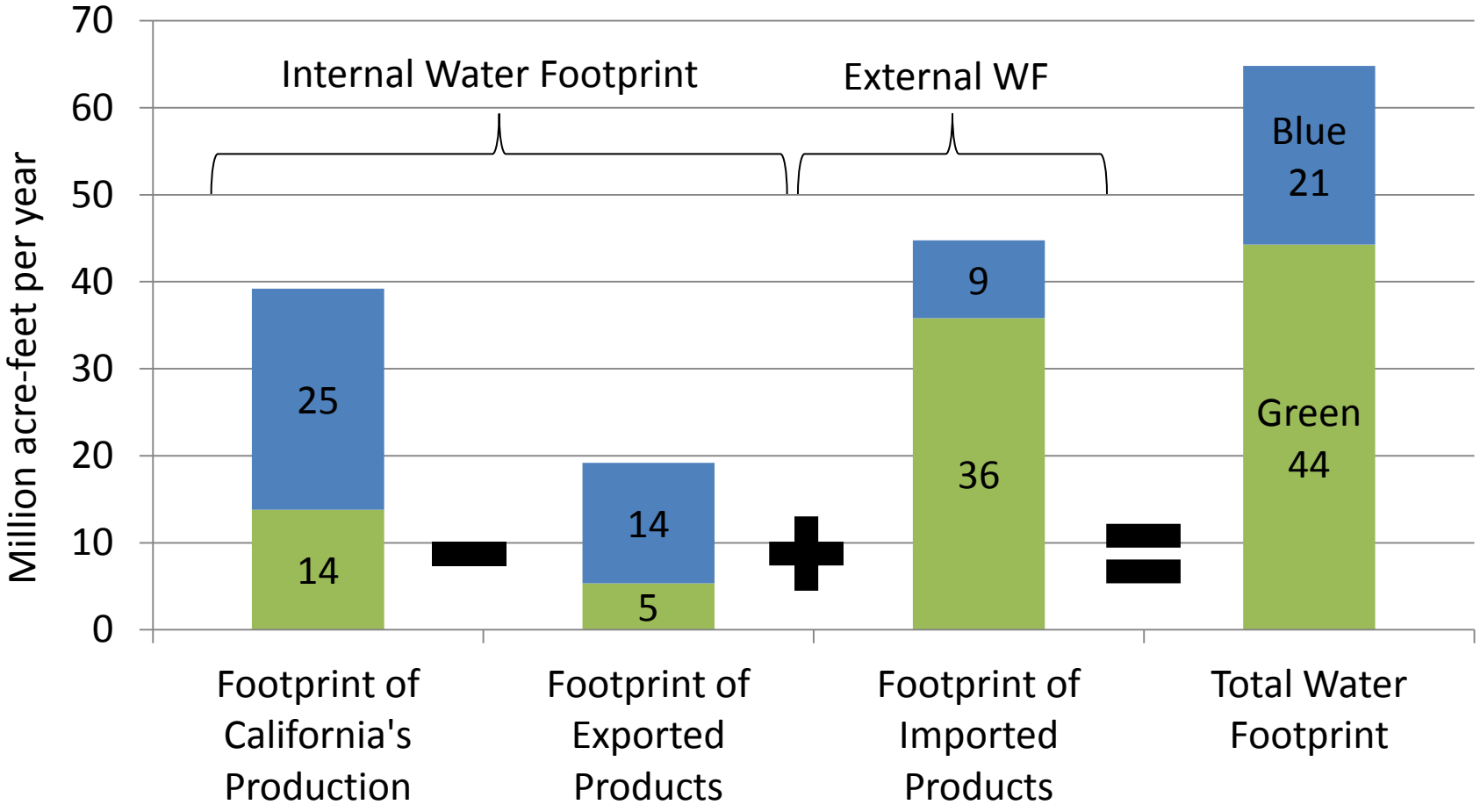
Term	Data Source
Footprint of California's production	DWR Land and Water Use Surveys, 1998-2005 DWR Commercial, Industrial, Institutional water use survey , 1995 DWR Water Plan Update 2009 USDA County Agricultural Commissioners' Production Data, 2007 US Census Bureau, Economic Census, 2007 USGS Estimated Water Use in the US, 2005 Water Footprint Network, avg. industrial grey water factors, 1996-2005
Footprint of products produced in California and exported	As above, combined with: US Census Bureau, Commodity Flow Survey, 2007 US Census Bureau, Foreign Trade Statistical Program, 2007
Footprint of products imported and consumed in California	US Census Bureau, Commodity Flow Survey, 2007 US Census Bureau, Foreign Trade Statistical Program, 2008 Water Footprint Network, WaterStat Database, 1996-2005

Results: major findings

- Californians, compared to the average American…
  …have about the same total WF, related to same products
  …rely much more on blue water
  …have a much larger external footprint

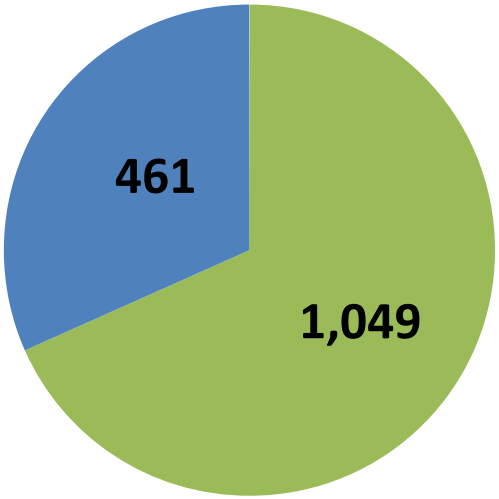
- California, as a whole…
  …is a net virtual water importer
  …exports half of the blue water that goes into production
  …imports more green water than statewide applied agricultural water

Blue and green water footprint



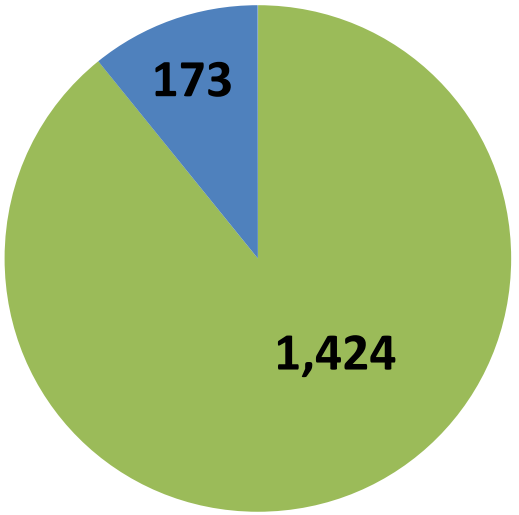
Blue and green water footprint

Water footprint for average Californian (gpcd) (Total = 1,510)



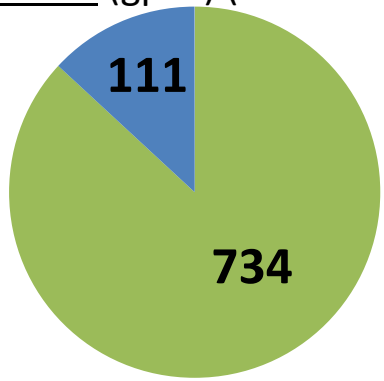
Source: Pacific Institute analysis

Water footprint for average American (gpcd) (Total = 1,597)



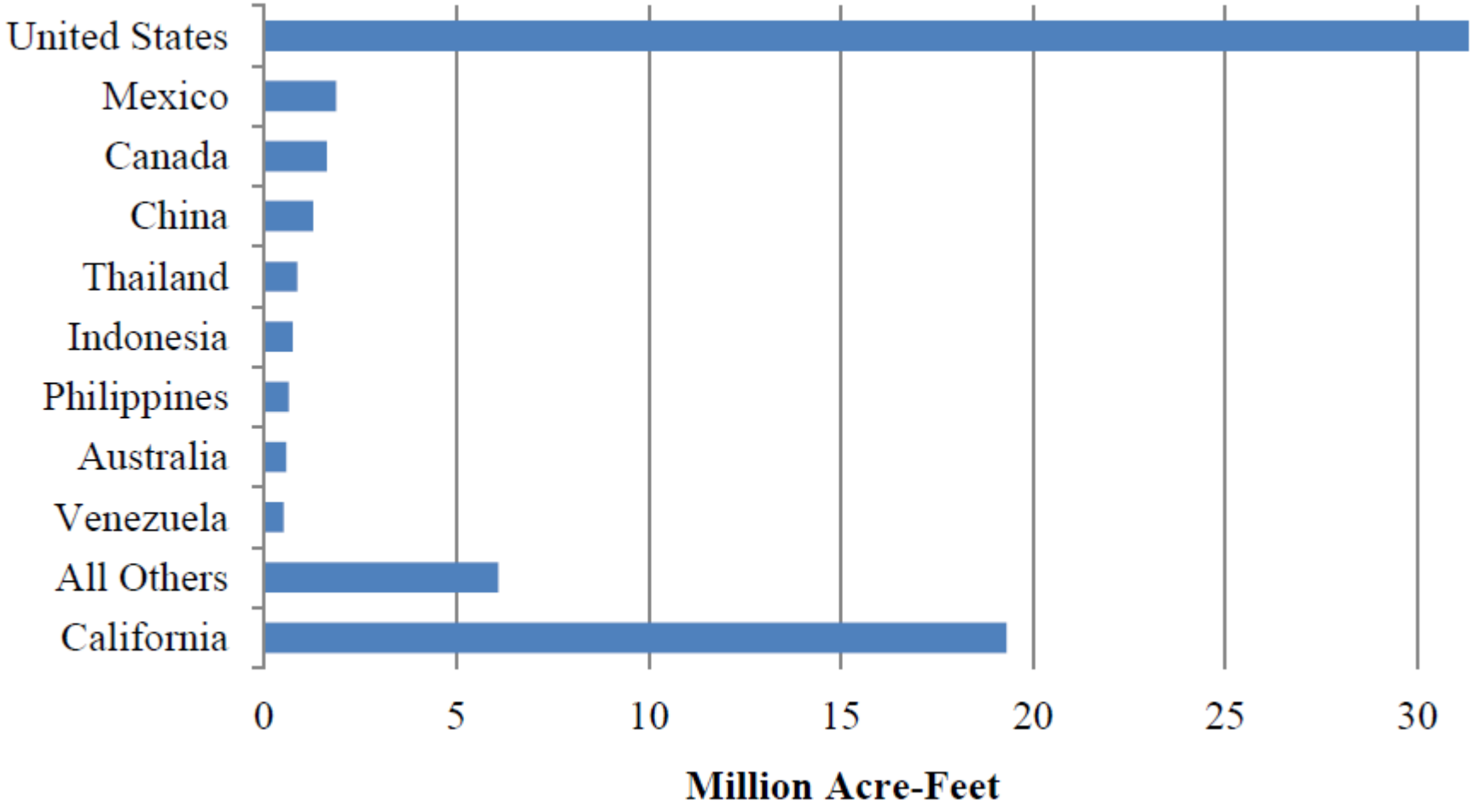
Source: Water Footprint Network

Water footprint for average human (gpcd) (Total = 845)

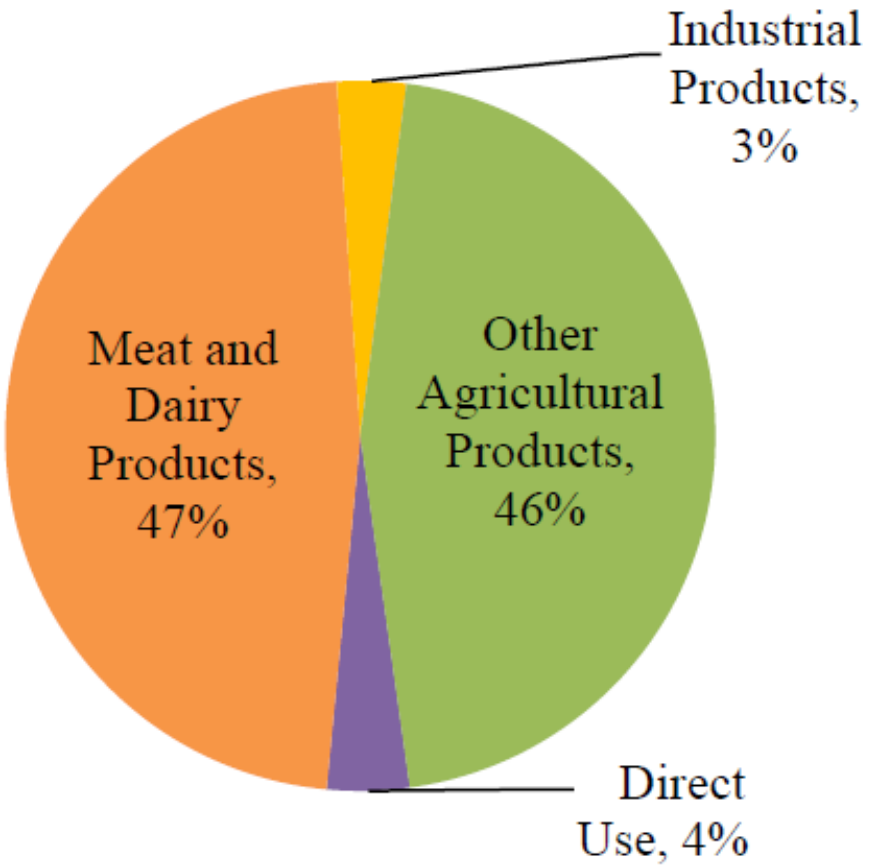


Source: Water Footprint Network

Water footprint, by location

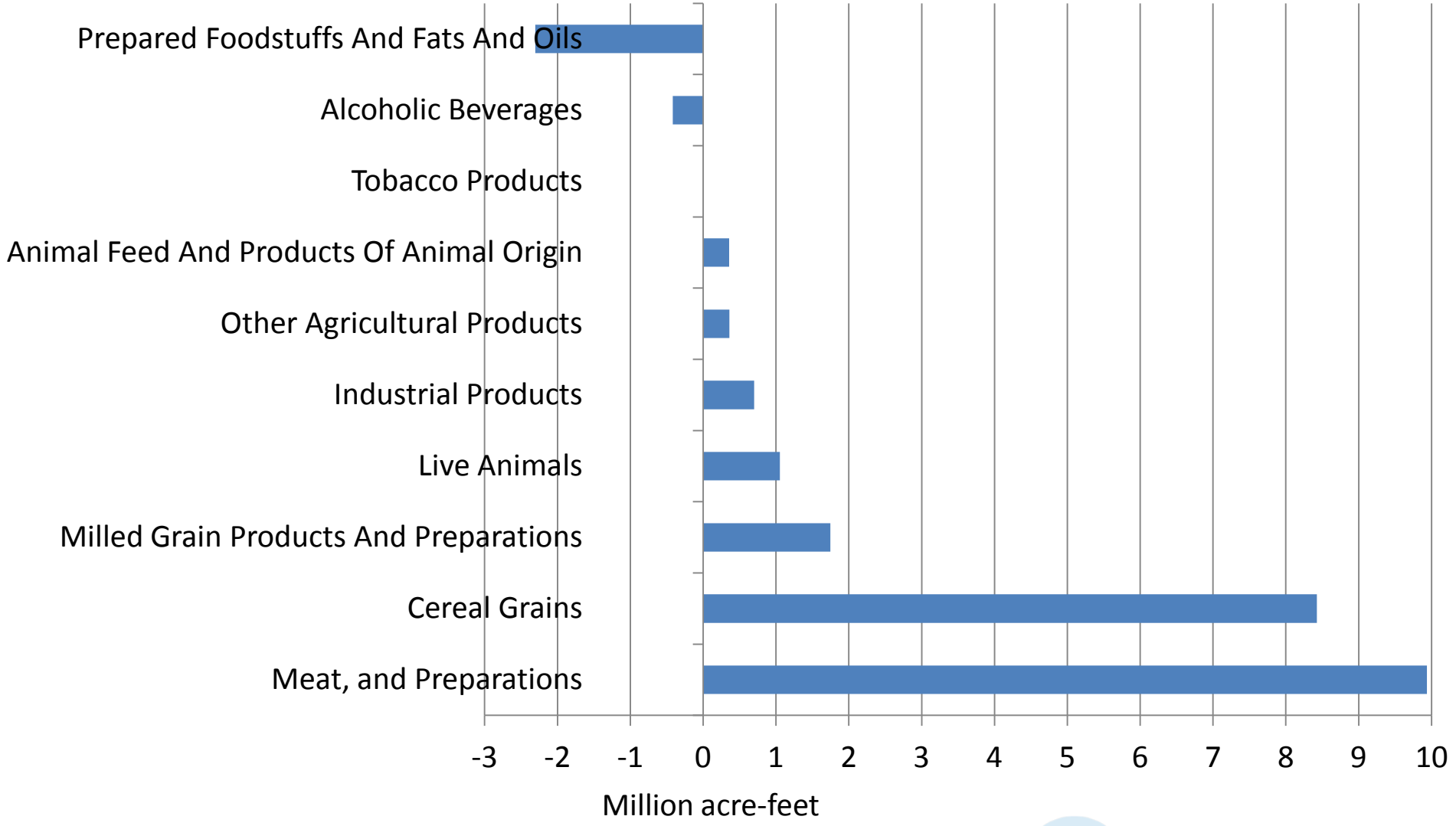


Water footprint, by sector

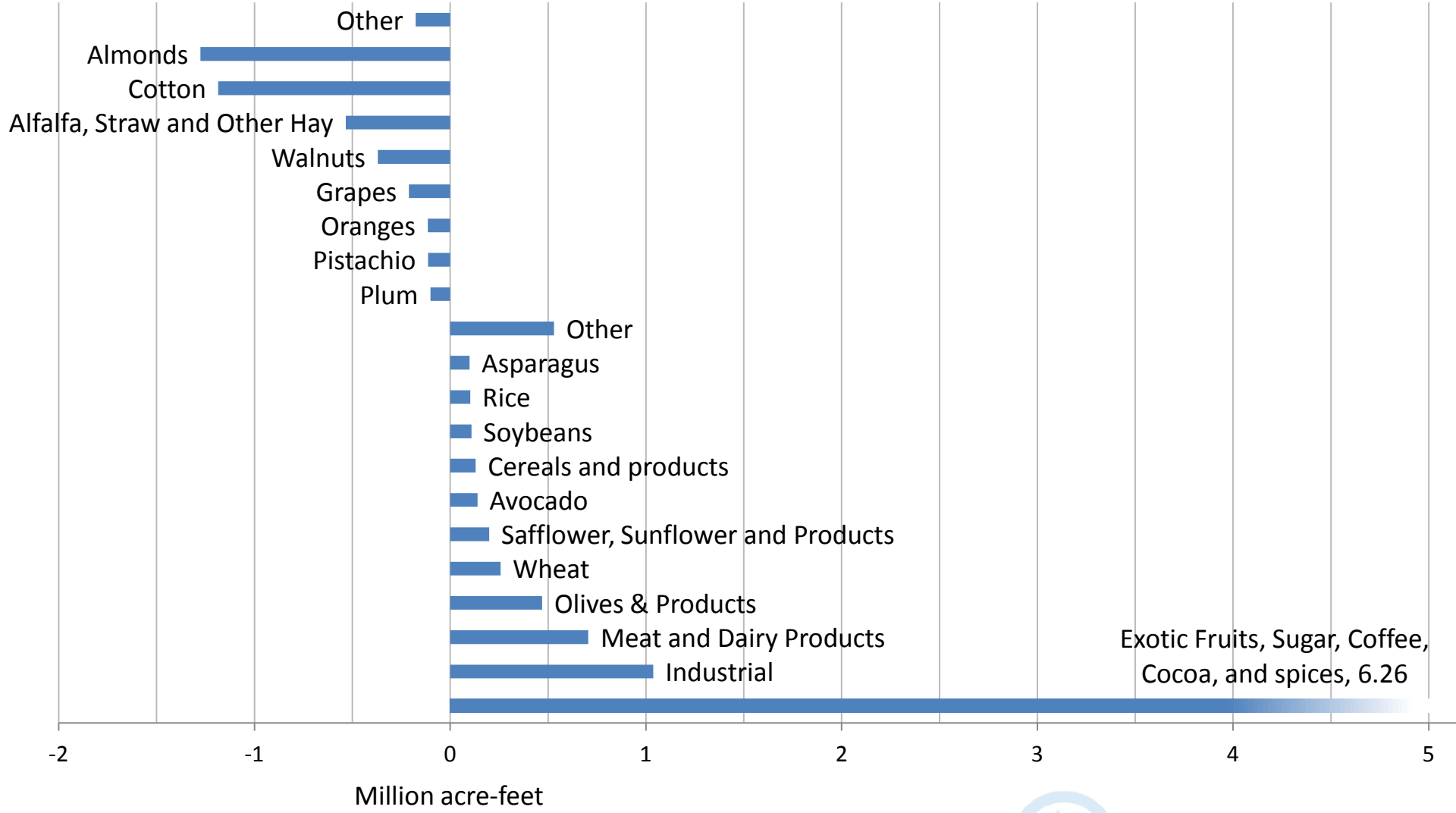


Total Water Footprint = 64 million acre-feet

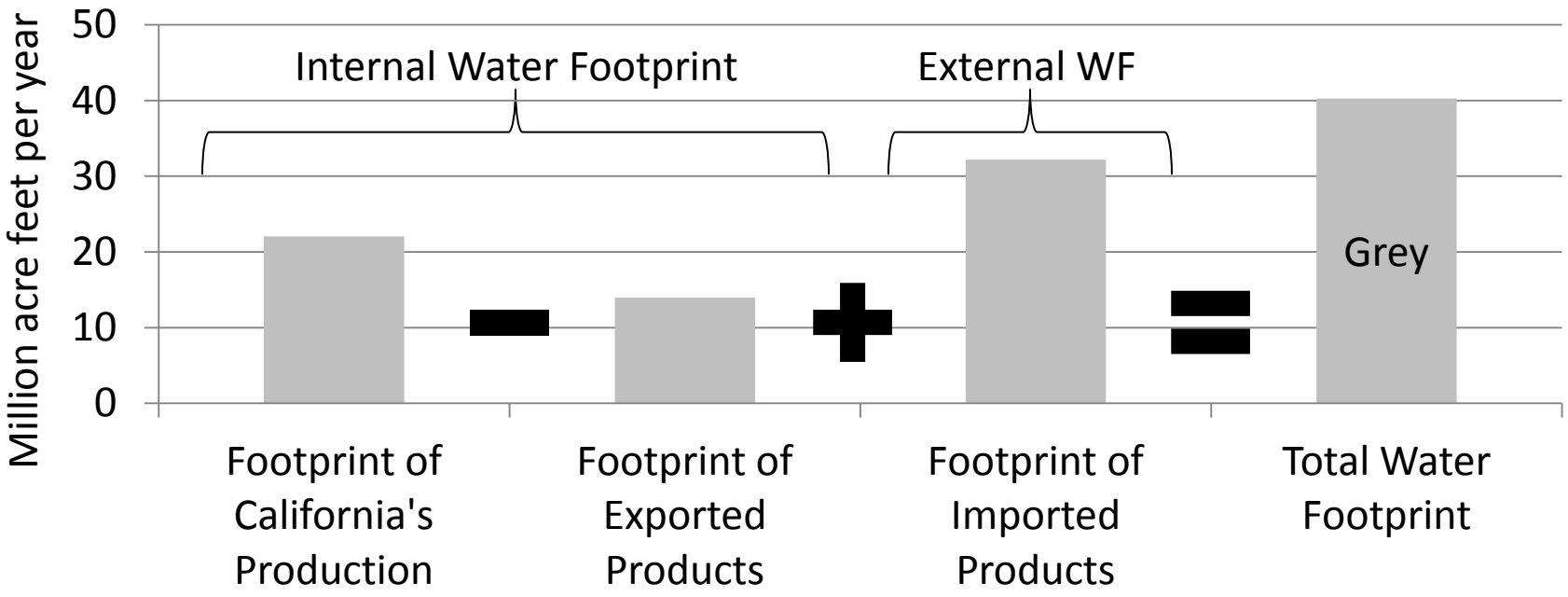
Domestic net water imports/exports, by product



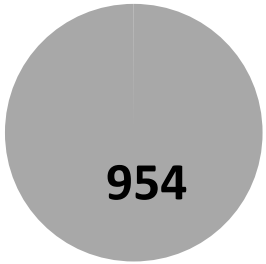
International net water imports/exports, by product



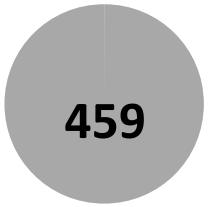
Grey water footprint



Source: Pacific Institute analysis



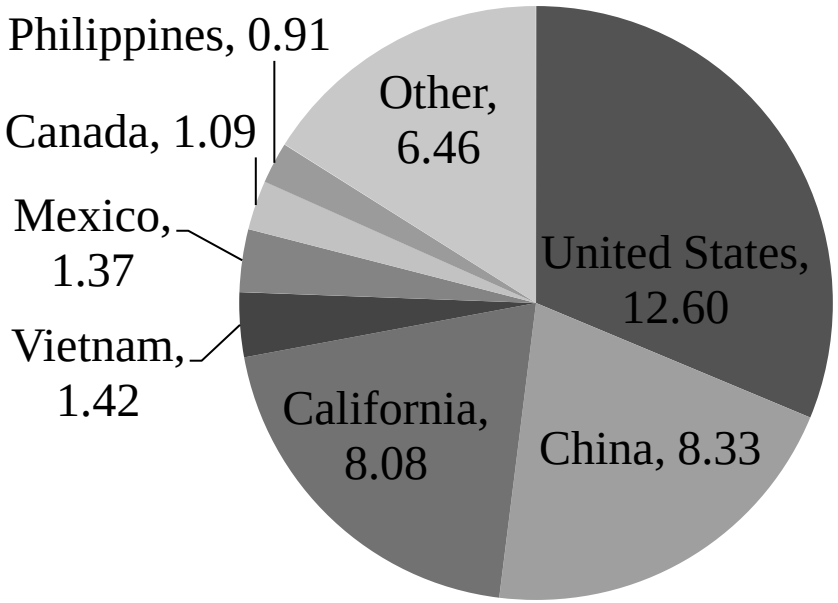
Footprint for average Californian (gpcd)

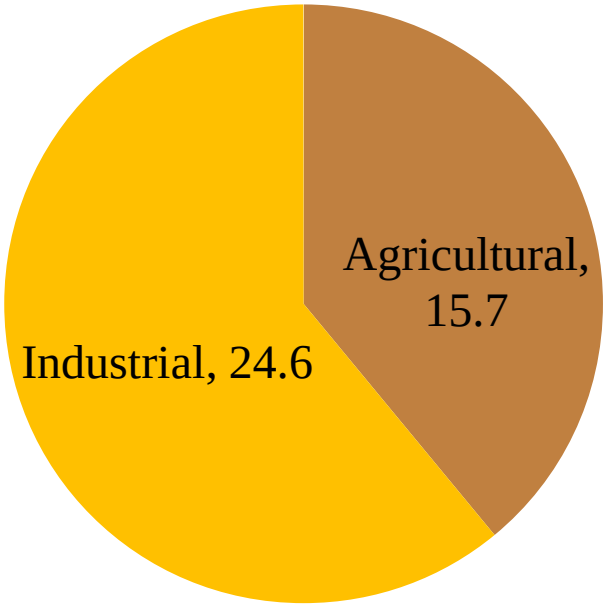


Footprint for average American (gpcd)

Source: Water Footprint Network

Grey water footprint





Conclusions

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Next Steps

Pacific Institute Lead:

- Calculating the Water Footprint of Energy Products
- Water Footprint Trends Analysis: 1990-2010
- Regional Water Footprints and Inter-Regional Flows

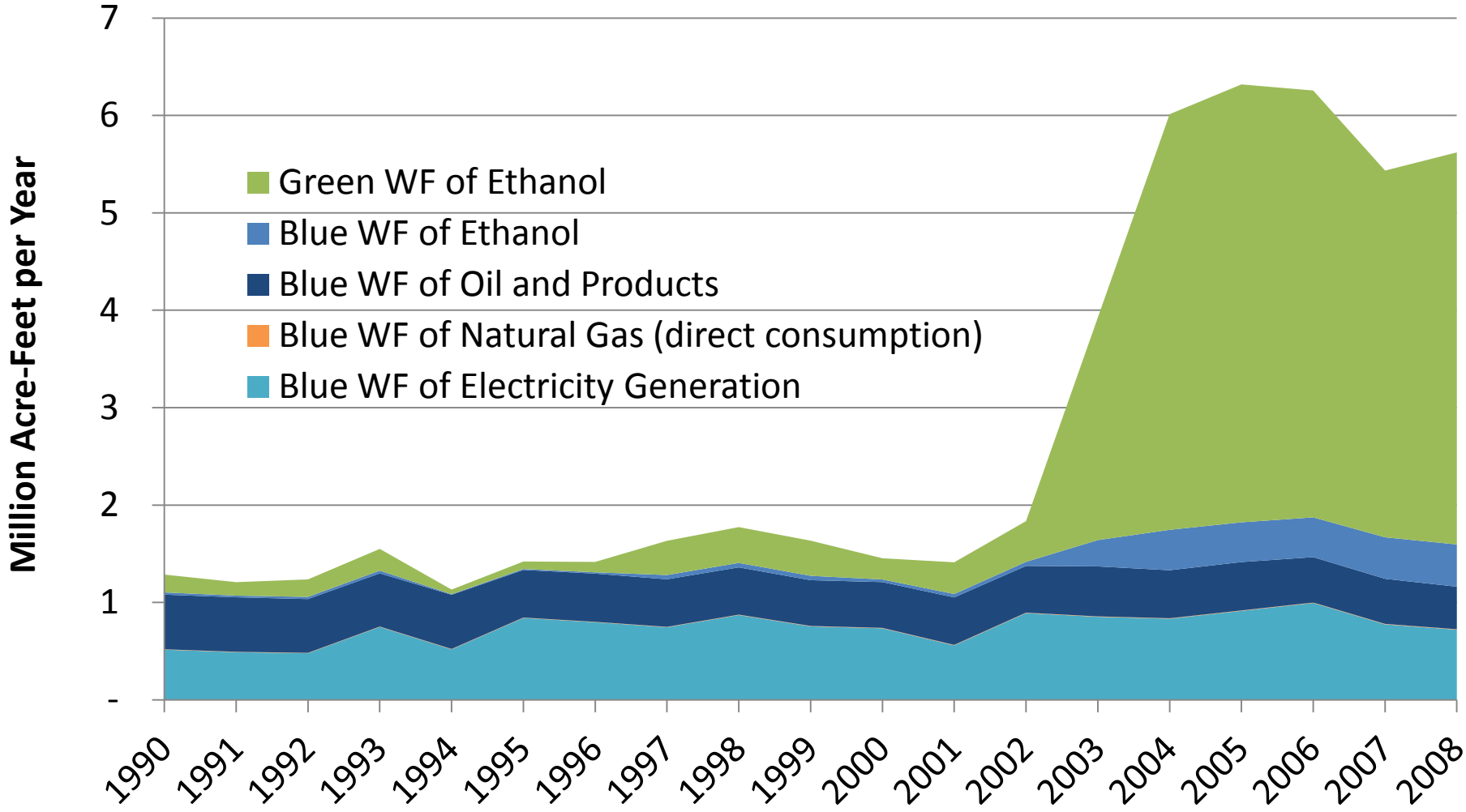
UC Davis Lead:

- Water Footprint Variance and Error Propagation Analysis
- Illustrate the Business Case for Water Footprint

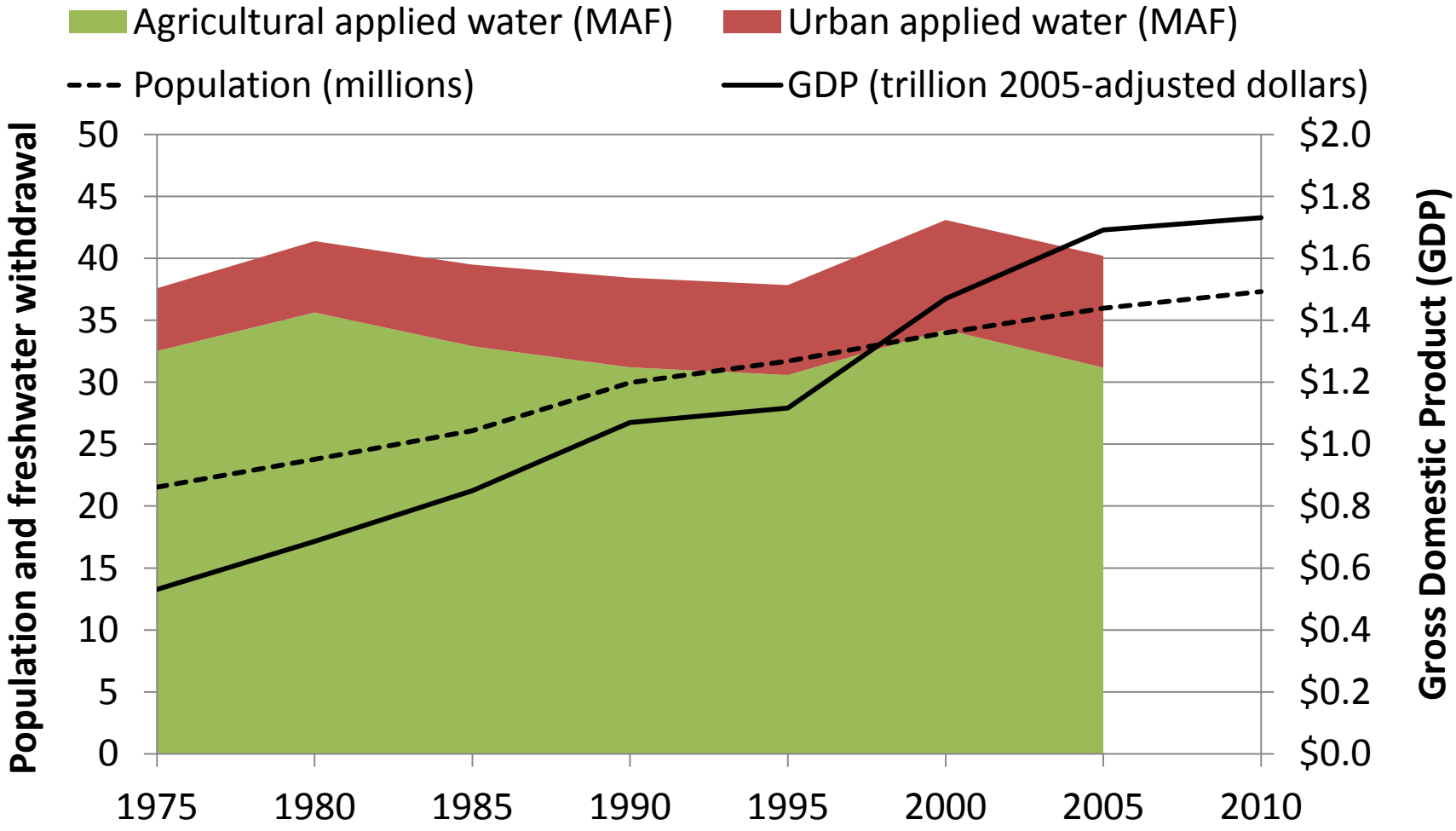
Policy Questions

- How does the water footprint indicator affect our working definition of sustainability?
- How broadly should water management in California consider water resources elsewhere? Are there risks?
- How should the water related costs and benefits of exports be considered alongside other water management criteria?

Next Steps: Energy



Next Steps: Trends



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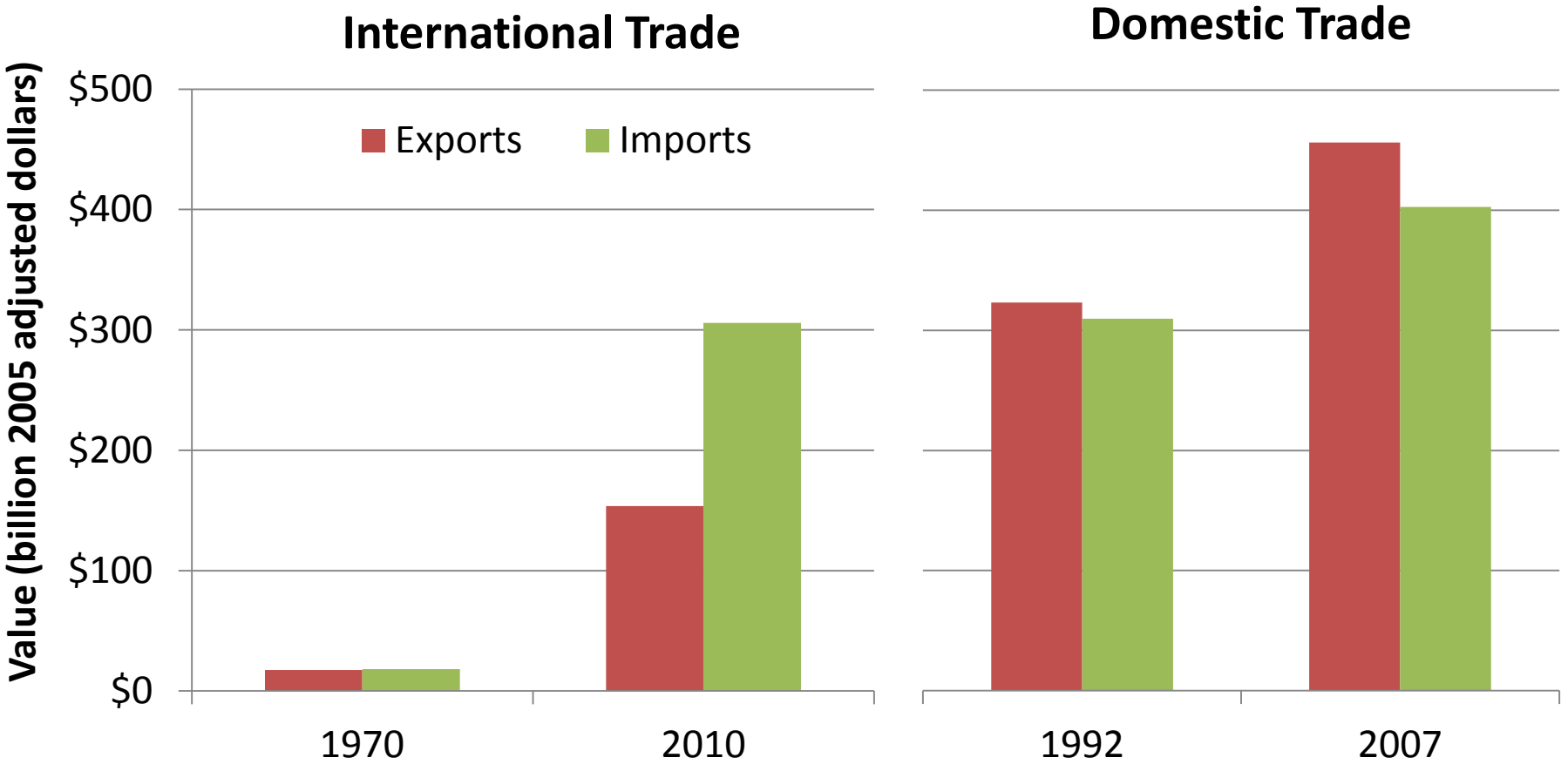
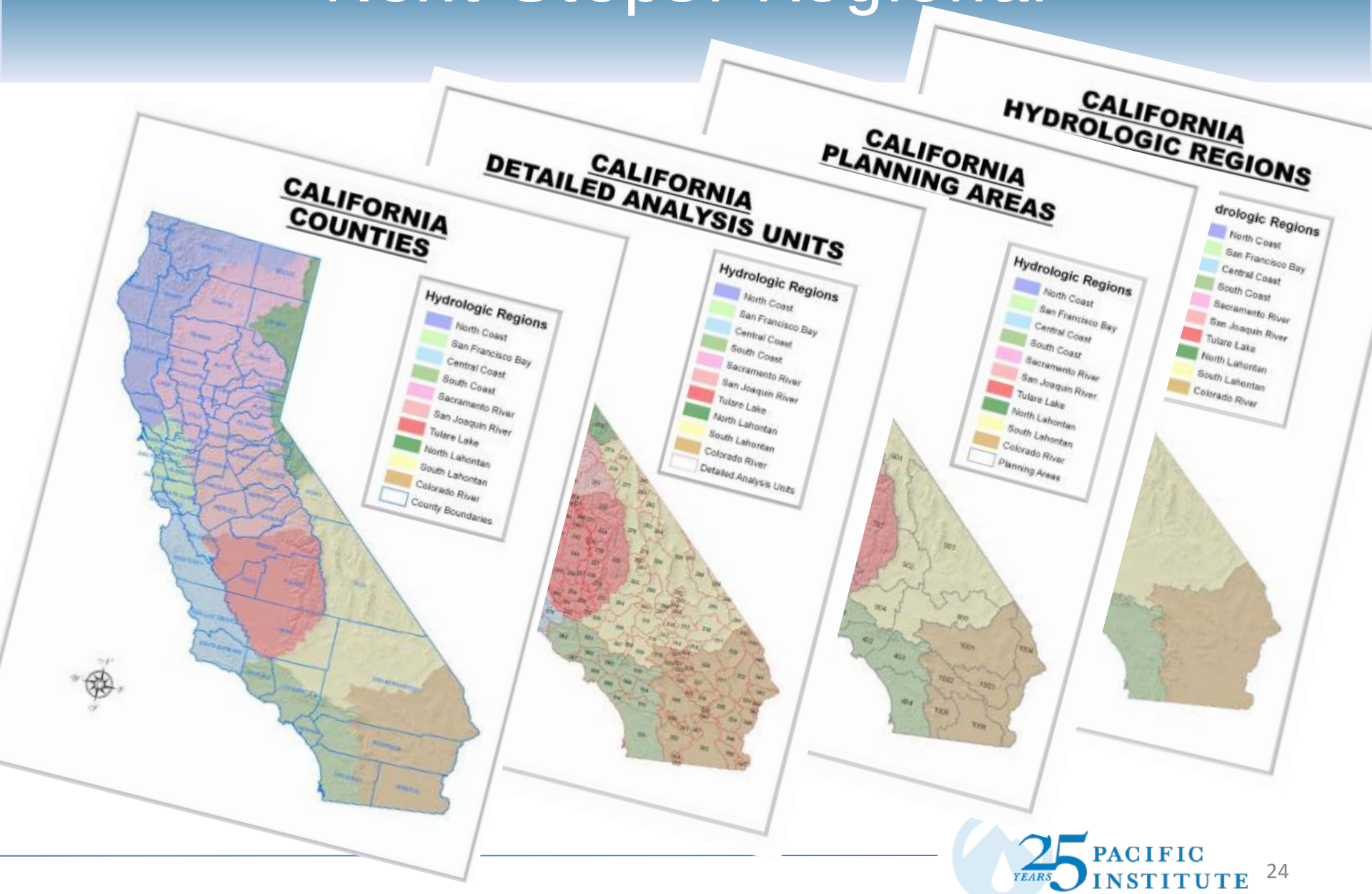


Next Steps: Regional



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