THE EUROPEAN WATER FRAMEWORK DIRECTIVE AND GROUNDWATER PLANNING IN THE AMERICAN SOUTHWEST

Groundwater resource development is being challenged as unsound ecologically and unsustainable economically. Wellfields that access aquifer storage have been long recognized as having an associated depletion effect on interrelated streams, in accordance with guidance from hydrologists Theis, Hantush, Jacob and others. River basins have been administered accordingly for 60 years in New Mexico, for example. Wide awareness has come more recently of the associated impact on ecosystems and on traditional water-use patterns. Where hydrologic effects of wellfields are fully understood, the issue remains of their acceptability in law and policy. Endangered-species recovery and ancient water rights, some established under earlier sovereigns, are increasingly enforced by court order requiring that the pre-development baseflow hydrograph and wetlands be respected. Water-planning policy in New Mexico seeks to reconcile the water-short hydrology with social objectives for growth and protection. The focus is on finding new water sources and preferred alternatives to match growing demands. Where there is no new water, water use shifts from farms to city wellfields. Prior rights and interstate compacts are administered, while impacts accumulate on ecological waters. The enormous volume of water in aquifer storage can be developed if the river baseflow is held at currently impacted levels.

Directive 2000/60/EC of the European Parliament established a framework for action in the field of water policy (The Water Framework Directive). The European focus is on recovering "good status" of the hydrologic system in quantitative and ecological terms by year 2015. Available groundwater, according to the framework, is that amount which does not significantly diminish the ecological status of associated surface waters. In contrast to the conventional planning approach in the American southwest, the European framework offers a different paradigm. Decide first on the status of the hydrologic basin that would be considered "good" in development and ecological terms, then manage water operations to be compatible. The stored resource in aquifers is a critical element to be managed in recovering the good status of the system.

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CHALLENGES TO GROUNDWATER RESOURCE DEVELOPMENT

- "The sustainability of groundwater represents one of the major water challenges."

  -3rd World Water Forum (2003)

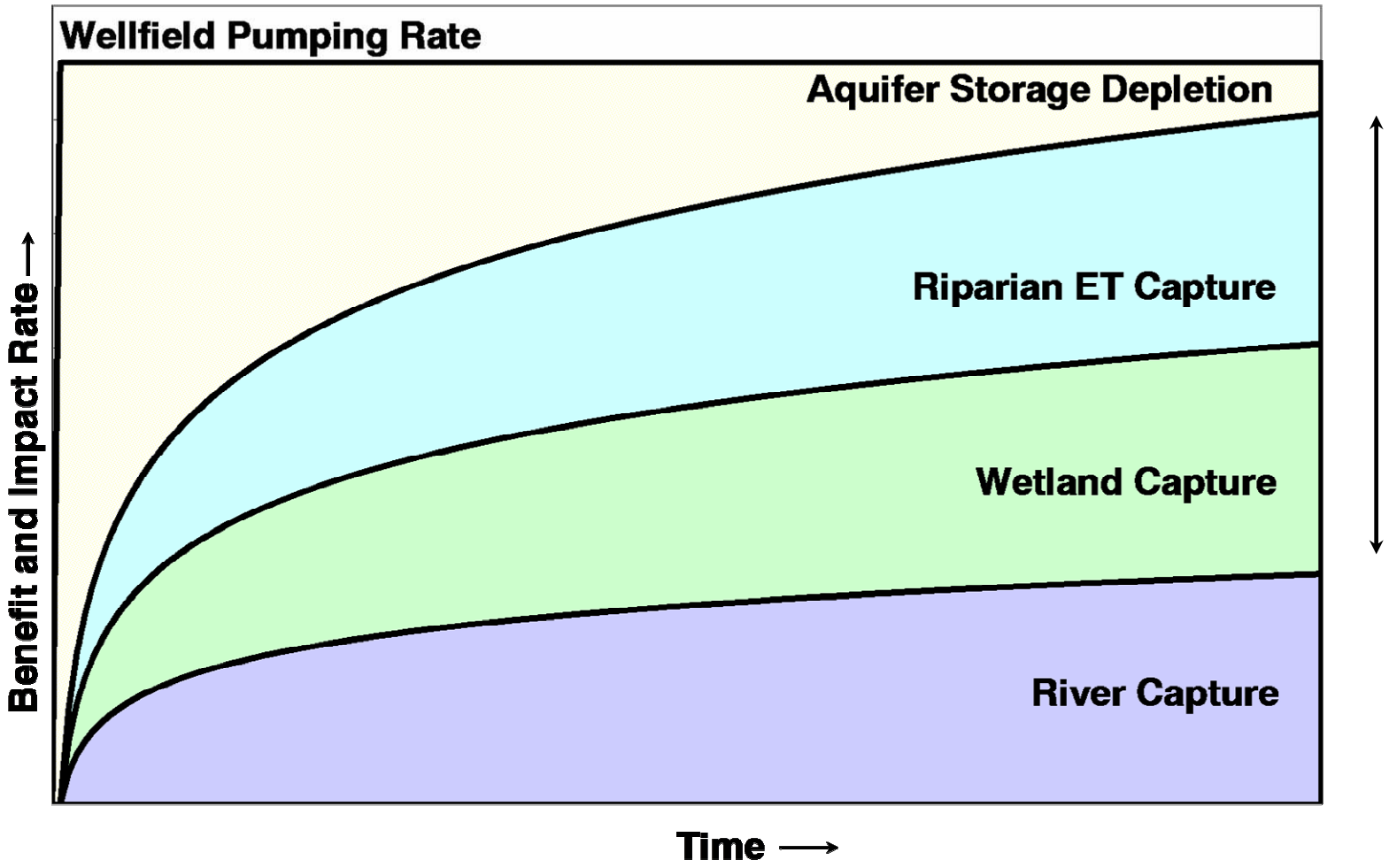
- "The problem of ground water mining represents a fundamental threat…"

  -World Bank (1999)

- "The country cannot sustain even the current levels of groundwater use…we must act to protect our rivers, springs, wetlands, lakes and estuaries from groundwater pumping."

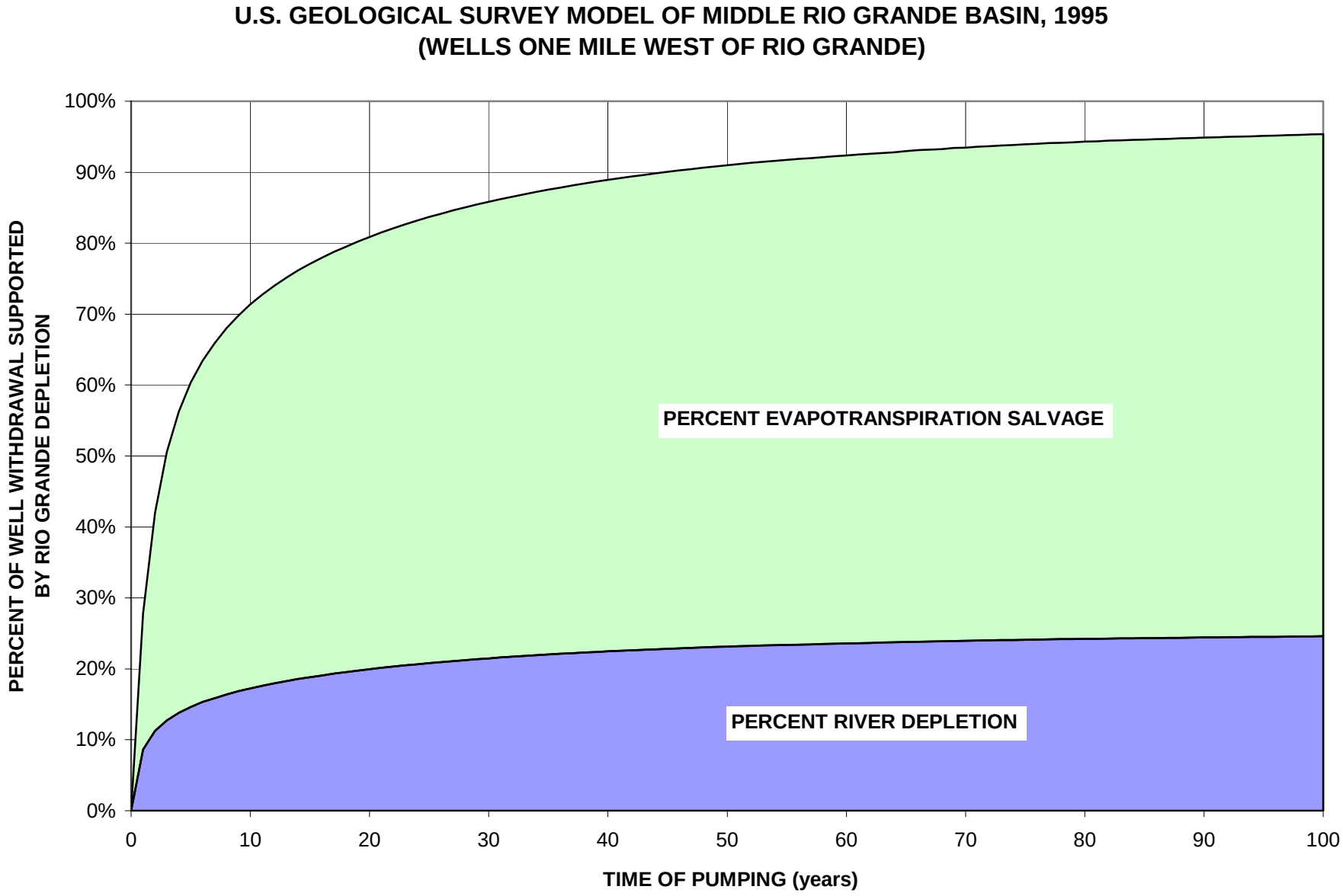
  -Water Follies (R. Glennon, 2002)

THE GROUNDWATER IMPACT PROBLEM



BENEFIT OF WATER SALVAGE BY WELLS

- **The net yield of wellfields is increased because wetland and riparian ET is not administered.**
- **Water is "salvaged" for use from the unmanaged ecological sources.**



Conclude: Western U.S. water use is enhanced by aquifer storage sources and by unaccounted ecological depletion.

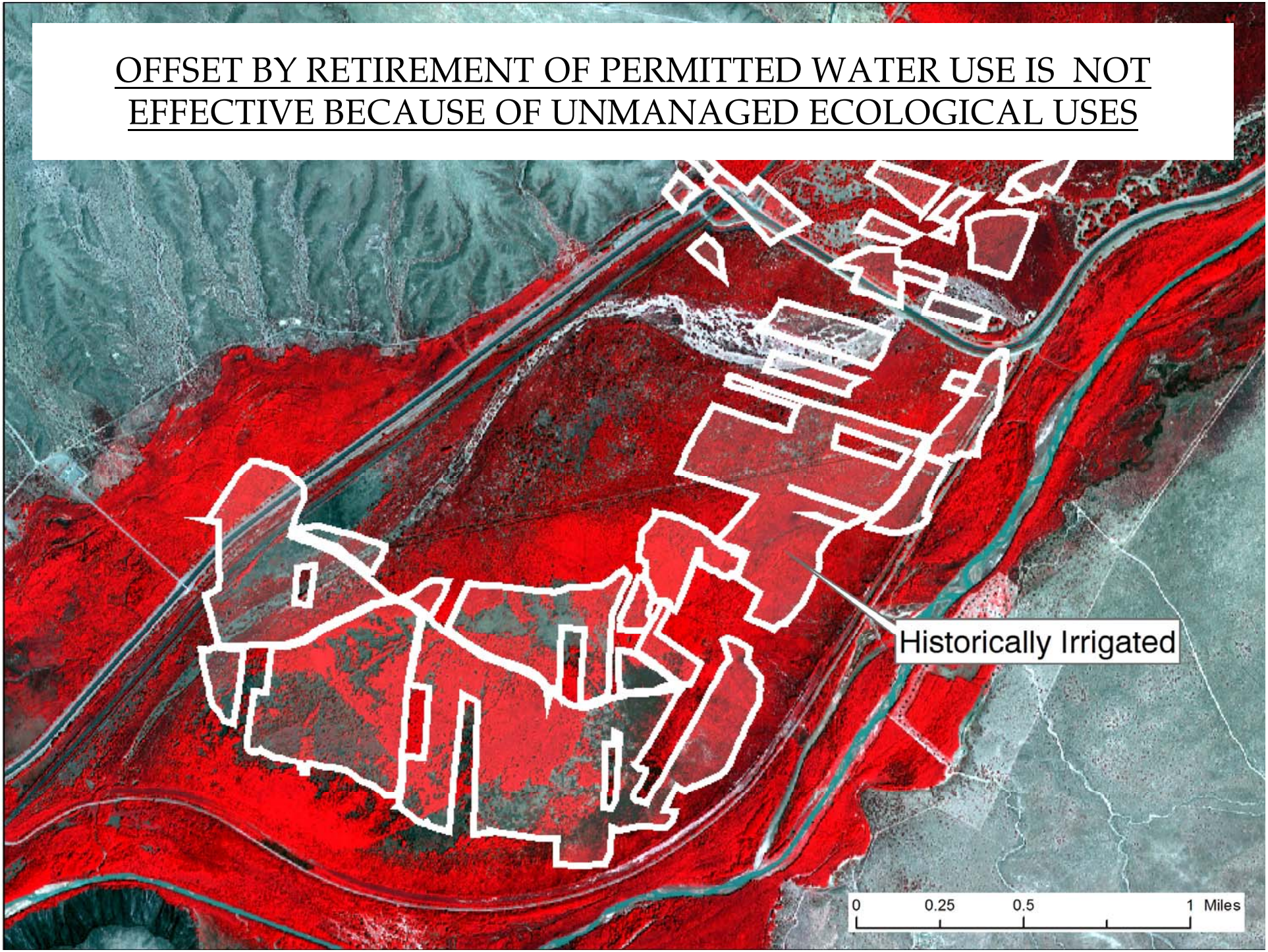
WESTERN WATER RIGHTS ACCOUNTING

- **Requires offset of river capture:**

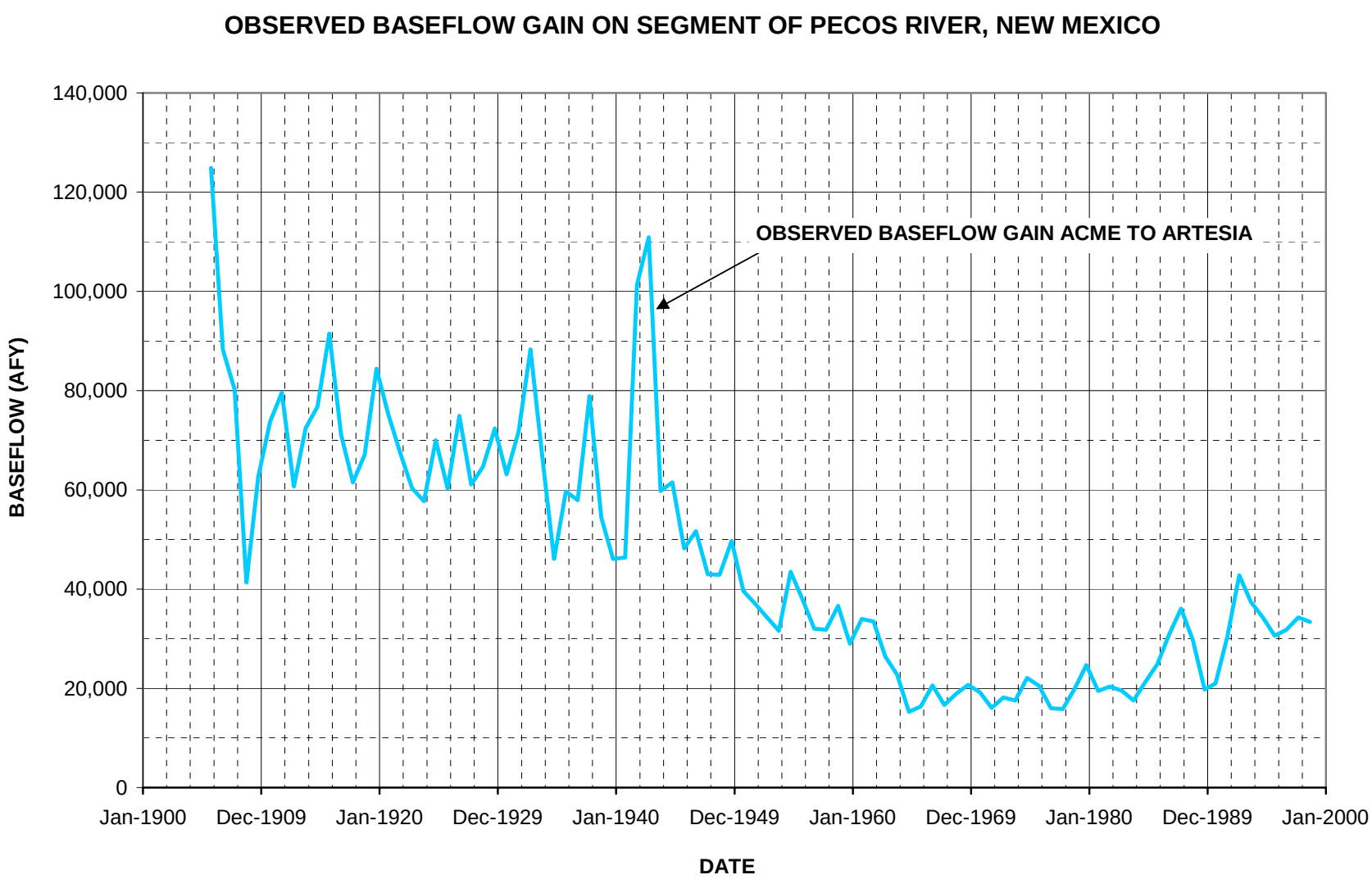
"Since the declaration of the Rio Grande Underground Water Basin, groundwater permittees have been required to obtain valid water rights in an amount sufficient to offset the effects of their diversions on the surface flows of the Rio Grande stream system. This requirement protects the surface flows of the Rio Grande stream system from being depleted or reduced by groundwater diversions."

-Middle Rio Grande Administrative Guidelines (September 13, 2000)

OFFSET BY RETIREMENT OF PERMITTED WATER USE IS NOT EFFECTIVE BECAUSE OF UNMANAGED ECOLOGICAL USES



TREND OF BASIN DRYING OUT DUE TO INEFFECTIVE ACCOUNTING OF ECOLOGICAL USES



ECOLOGICAL IMPACTS ARE BECOMING ACCOUNTABLE

- **In the United States District Court for the District of New Mexico**

"It is Therefore Ordered that:

The Bureau of Reclamation must provide sufficient flows of water for the remainder of 2002 to maintain a flow of 50 cfs at San Acacia Diversion Dam, and to maintain a flow in the Albuquerque Reach from Angostura Diversion Dam to Isleta Diversion Dam."

-James A. Parker, Chief United States District Judge

NEW MEXICO WATER PLANNING

"1. The heart of the exercise is for the region to provide enough information, analysis and documentation to answer the following questions.

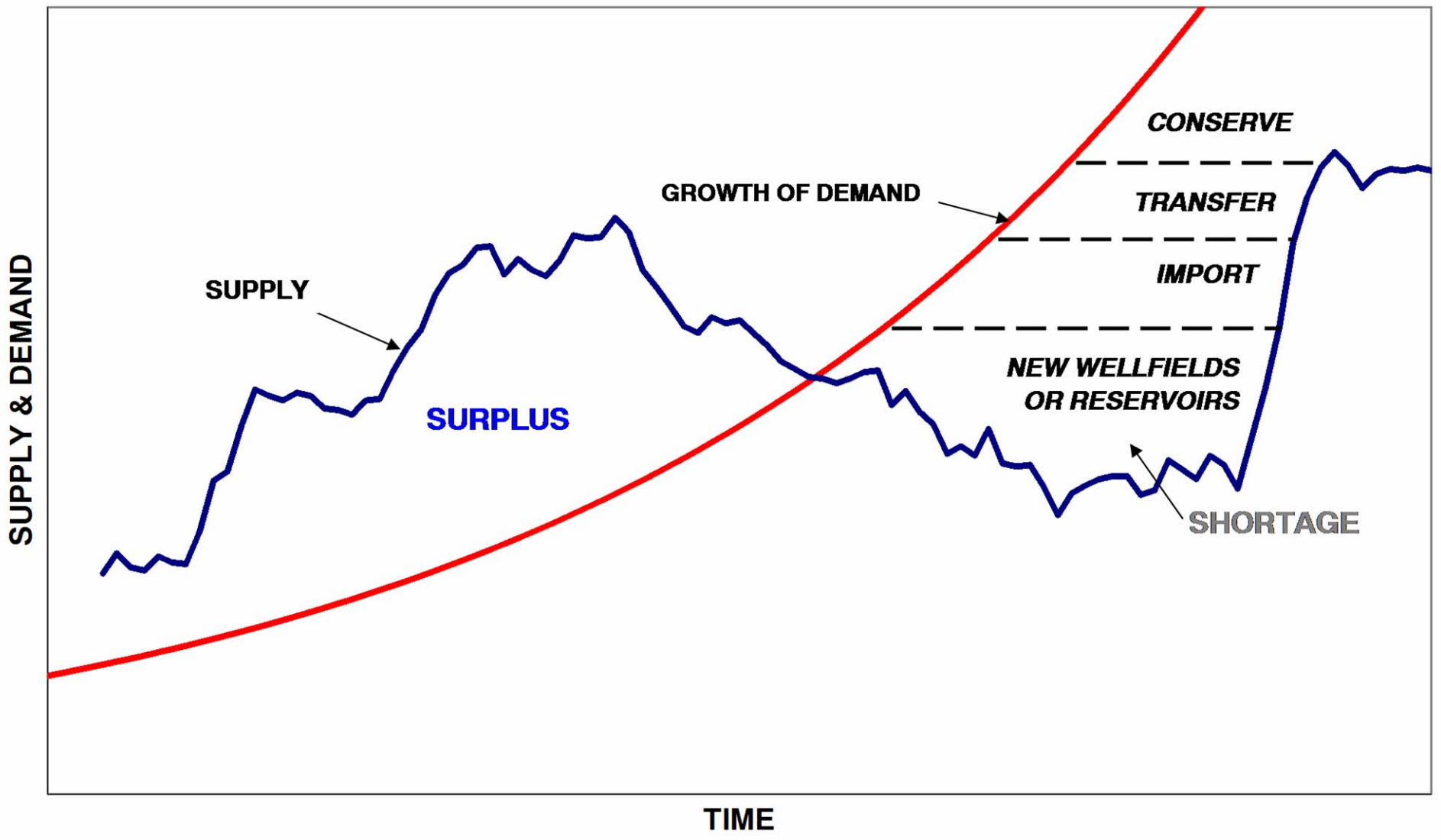
a. What is the region's available water supply?

b. What is the region's future water demand?

c. How will the region undertake to meet demand with supply?"

-Regional Water Planning Handbook, 1999

GROWTH VS. SUPPLY



DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT

-A FRAMEWORK FOR COMMUNITY ACTION IN THE FIELD OF WATER POLICY

- "…a new, integrated approach to the protection, improvement and sustainable use of Europe's rivers, lakes, estuaries, coastal waters and groundwaters."

- "…good groundwater status is designated to ensure a long-term supply of water for people's use while protecting and…restoring the water needs of those surface water bodies and terrestrial ecosystems, such as wetlands, that depend on groundwater flows."

-United Kingdom Environment Agency (2002)

WATER FRAMEWORK DIRECTIVE

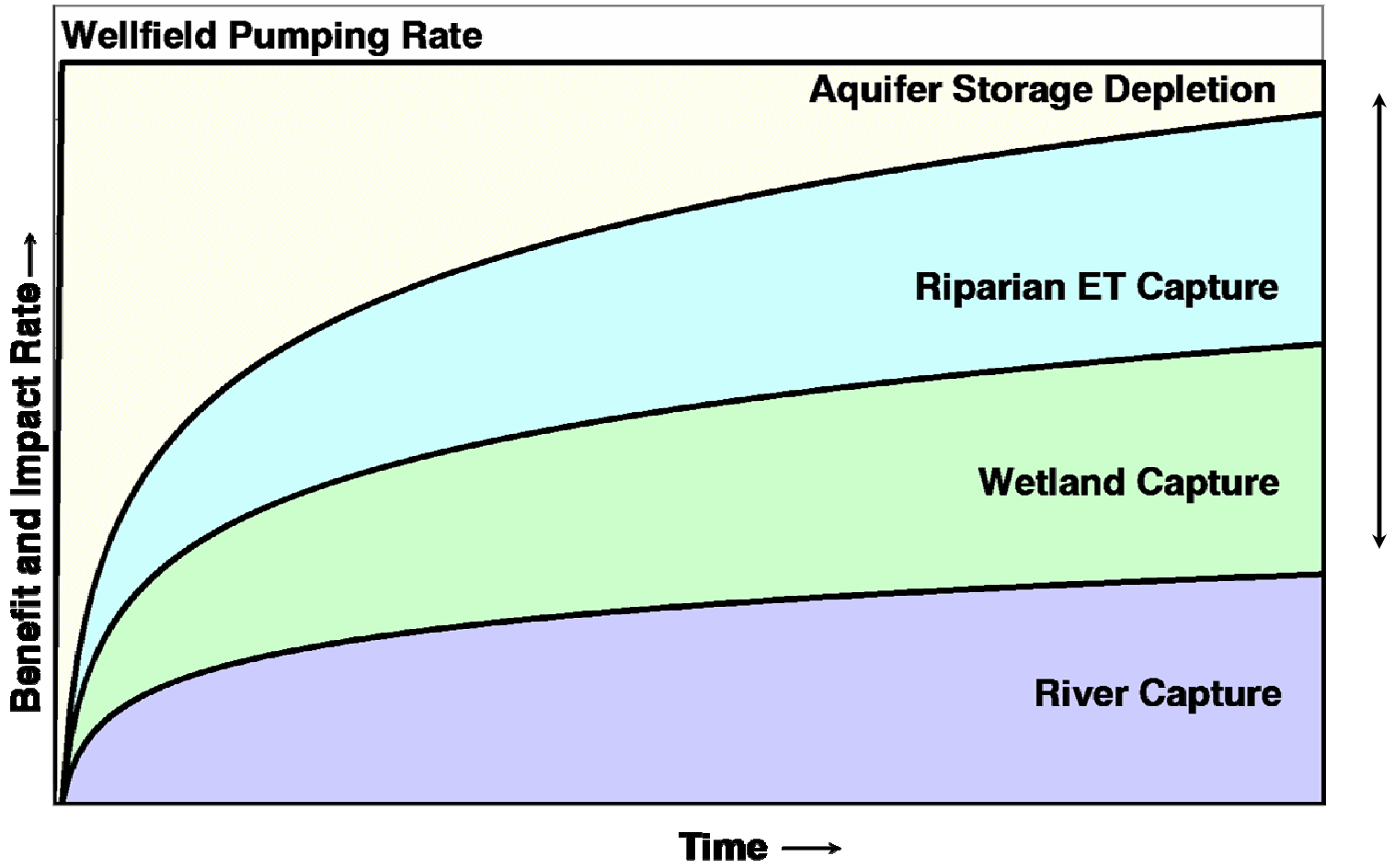
- 'Good groundwater status' means both its quantitative status and its chemical status are at least 'good'.

- 'Available groundwater resource' means the … overall recharge of the body of groundwater less the long-term annual rate of flow required to achieve the ecological quality objectives for associated surface waters … and to avoid any significant damage to associated terrestrial ecosystems.

- 'Good quantitative status' means the level of groundwater in the groundwater body is such that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction."

-Official Journal of the European Communities (2000)

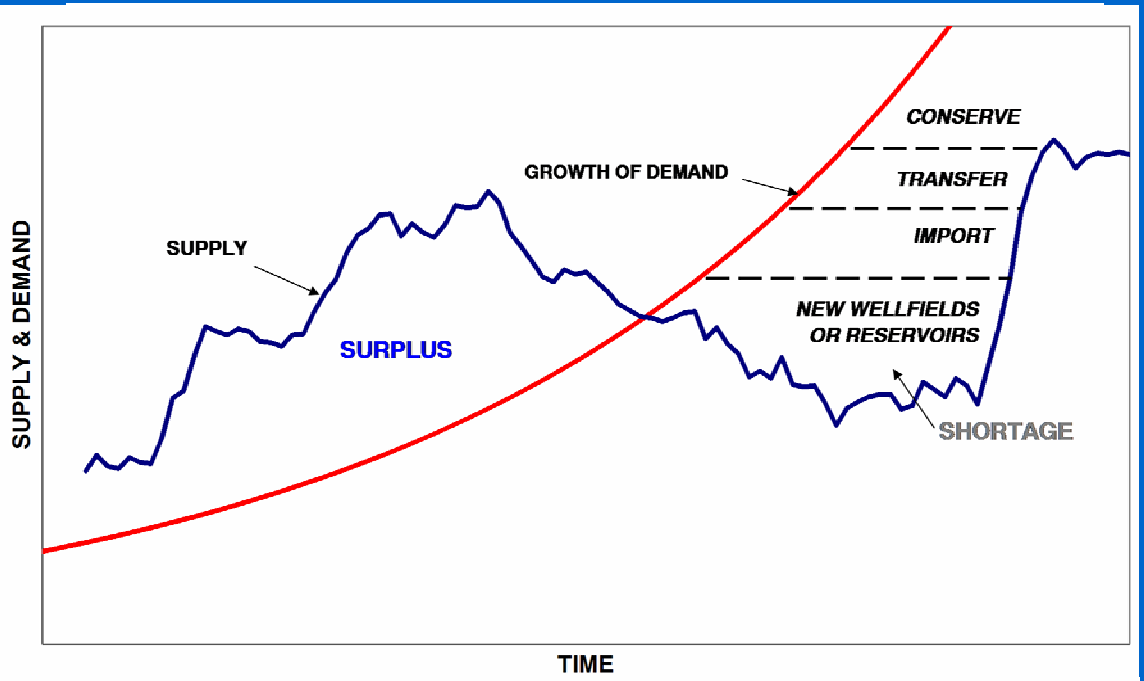
HOW CAN GOOD STATUS BE QUANTIFIED?



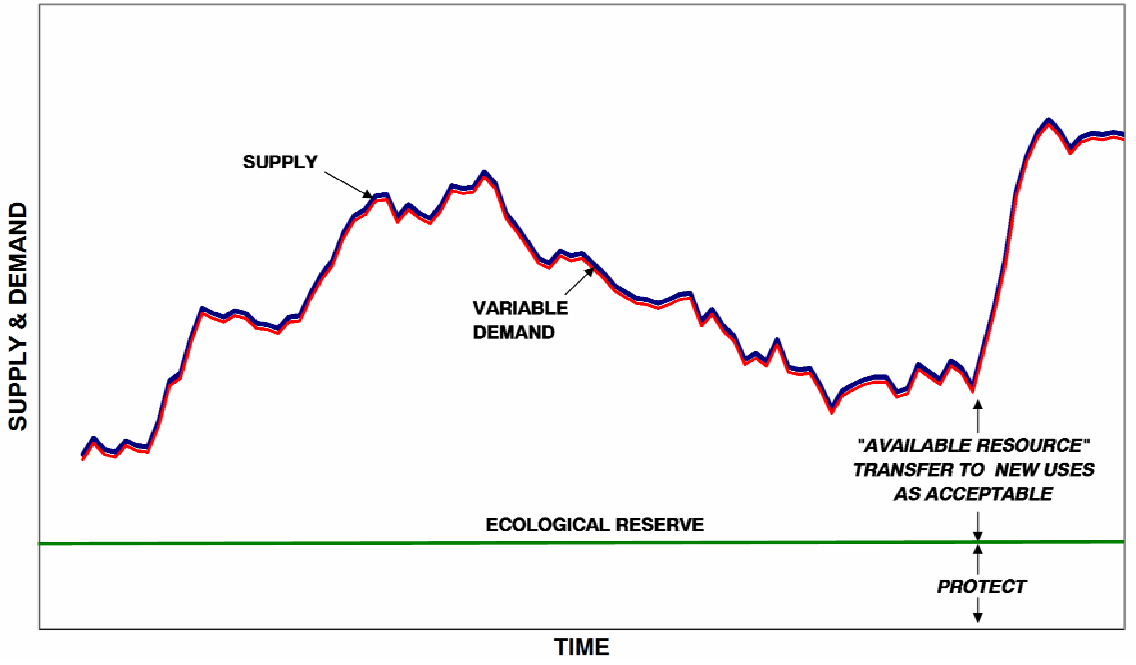
Conclude: Groundwater can be used sustainably with managed levels of induced recharge and with acceptable ecological effects.

THE OLD AND NEW PARADIGM

OLD



NEW



SUSTAINABLE GROUNDWATER

- Creates a managed, desirable groundwater condition regarding levels and chemistry.
- The "available groundwater resource" is the amount that also achieves ecological objectives.
- Administering surface water rights does not result in ecologically sustainable groundwater development.
- The benefits of groundwater storage development need not be abandoned in the name of "sustainability".