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Riparian vegetation monitoring for the Colorado River Ecosystem

Barbara E. Ralston

U.S. Department of the Interior
U.S. Geological Survey

Introduction- Goal 6 Riparian and Spring Communities

- Management Objectives – 7
  - Associated with a specific element of the riparian community
  - Define hydrological areas, habitats and elements
  - Some elements in 1 MO are a component of another.

- 6.1
- Maintain marsh community abundance, composition, and area in the CRE in such a manner that native species are not lost.
- 6.2
- Maintain NHWZ community patch number and distribution, composition and area to be no lower than values estimated for 1984.
- 6.4
- Maintain sand-beach community abundance, composition, and distribution in the Colorado River ecosystem at the target level.

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Previous sampling approaches

- EIS – debris fan and marshes – intensive sampling – productivity- 2 sites/reach/independent bird surveys
- Post EIS- vegetation patches – debris fans-eddies – estimated cover/composition – few sites (1 site/reach)/Independent bird surveys
- 2001-04 TEM – randomized, rotated plots – 60 4-sq. meter plots/year (240 sq m) sampled at hydrologic stages. Independent of geomorphic feature.
- 2006-2009 – randomized plots – 80 larger 50 sq m. associated with stage elevations, but not tied to specific geomorphic features.

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Protocol Review Panel Recommendations

- **Review Management Objectives for relevance to dam operations, clarity and realism**

- **Many springs are associated with ground-water discharge above the river.**
- **The old high water zone is a relict of the historic river system and is unlikely to be maintained w/o planting, irrigation and land management**
- **Vegetation reduction may be necessary to reach management objectives associated with sand beach community.**
- **NHWZ is dominated by tamarisk and may not be a desirable element to maintain, though it is part of the NHWZ. Patch number may not be a realistic metric given reduced disturbance magnitude.**
- **Maintenance of marshes should be a priority for managers.**
- **Animal monitoring should be associated with CMIN 6.1-6.5 and coordinated with Grand Canyon National Park**

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Protocol Review Panel Recommendations

- Vegetation Sampling
- Continue the Generalized Random Sampling Approach
- Stratify sampling by incorporate Debris-fan eddy complexes as sampling unit. – distance and canyon width does not link to geomorphic processes.
- Determine frequency needed for sampling

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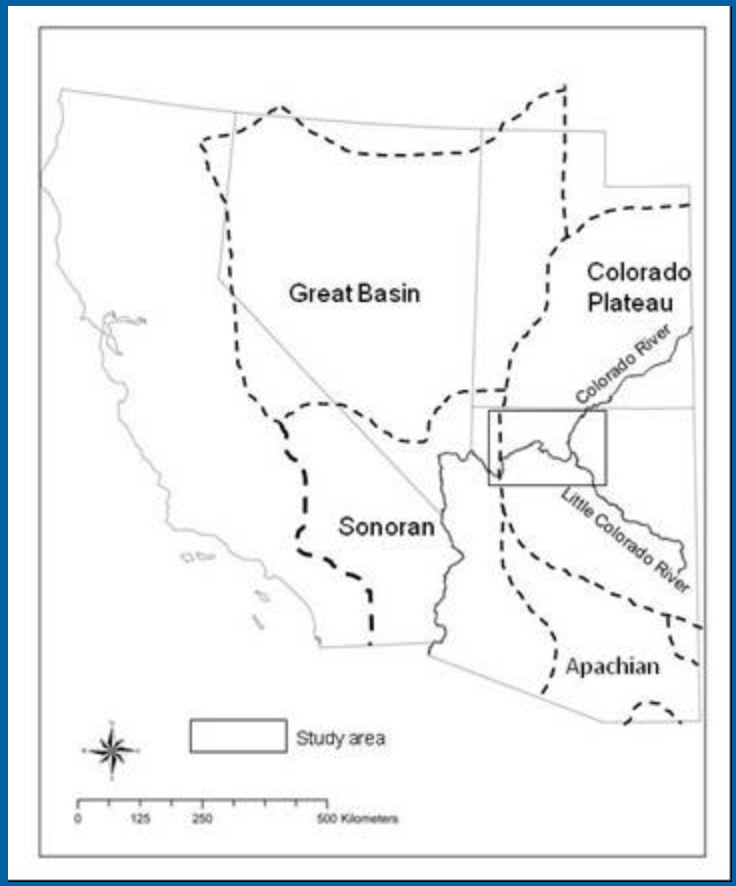
Vegetation sampling approach

Floristic area influence on vegetation

- **Great Basin**
- **Colorado Plateau**
- **Sonoran Desert**



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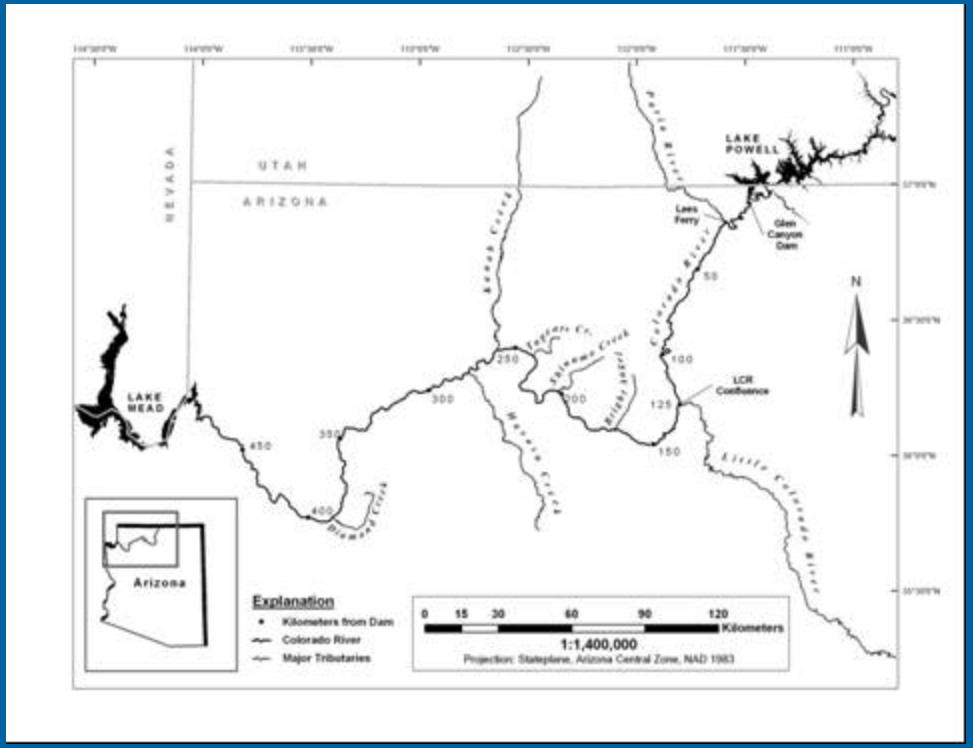
Vegetation sampling approach

Four General Reaches – tributary/dam effects

Glen Canyon
Marble Canyon
Upper/lower
Eastern Grand Canyon
Western Grand Canyon



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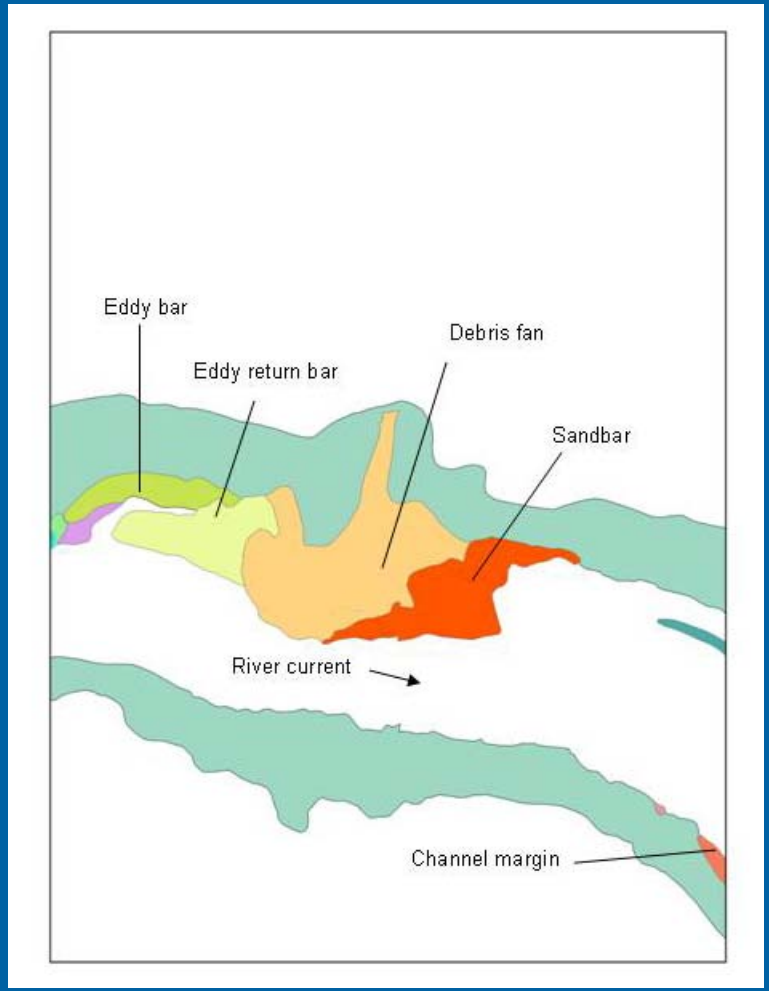
Vegetation sampling approach

Primary sampling unit within each larger tributary reach



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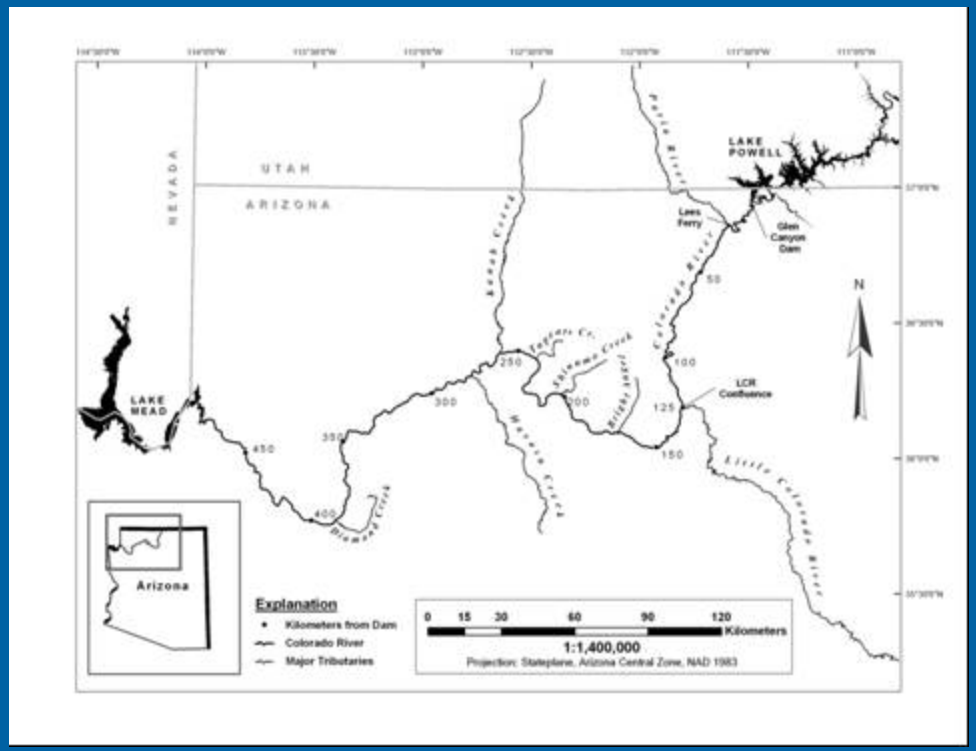
Vegetation sampling approach

Randomized sampling of debris-fan eddys and channel margin within four larger reaches- using shoreline map and debris fan GIS coverage for site selection.

Power analysis of sampling effort within each reach



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Animal sampling

Coordinate with NPS in bird surveys
Increase sample sites and trips

Evaluate utility of arthropod sampling following review of Glen Canyon pilot study – January reporting meeting

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