HUALAPAI TRIBE

Evaluating Hualapai Cultural Resources Along The Colorado River, 2001, Final Report and parts of 2002 Draft Report

Prepared for the Technical Working Group Meeting November 7-8, 2002, under the Bureau of Reclamation Cooperative Agreement with the Hualapai Tribe, Modification No. 003-005 to Grant No. 99-FC-40-1820

River Trips, 2001 & 2002

- Three river trips:
- TWG trip in March, 2001
- Annual Hualapai Cultural PA monitoring trip in June, 2001.
- Annual PA monitoring trip in August, 2002 below Diamond
- Helicopter flights to National Canyon and Granite Park in August, 2002

March 2001 TWG river trip participants

Hualapai Colorado River Corridor TCP Evaluation Database

- Traditional Cultural Properties (TCPs) Evaluation Database was developed in order to further incorporate TCP analysis in evaluation and monitoring procedures.
- The database was created in conjunction with revised in-field evaluation forms during site visits.

- Each form was individually designed for the evaluation/monitoring of natural, human and *dam* related impacts on all features (including archaeological, ethnobotanical and other TCP features) at each TCP site.
- The impacts were then quantified and recorded in-field on a 5-point scale, from 0 (absent) to 4 (severe).
- The forms and database also include comment sections to record qualitative data to be used for cross-year impact comparisons.

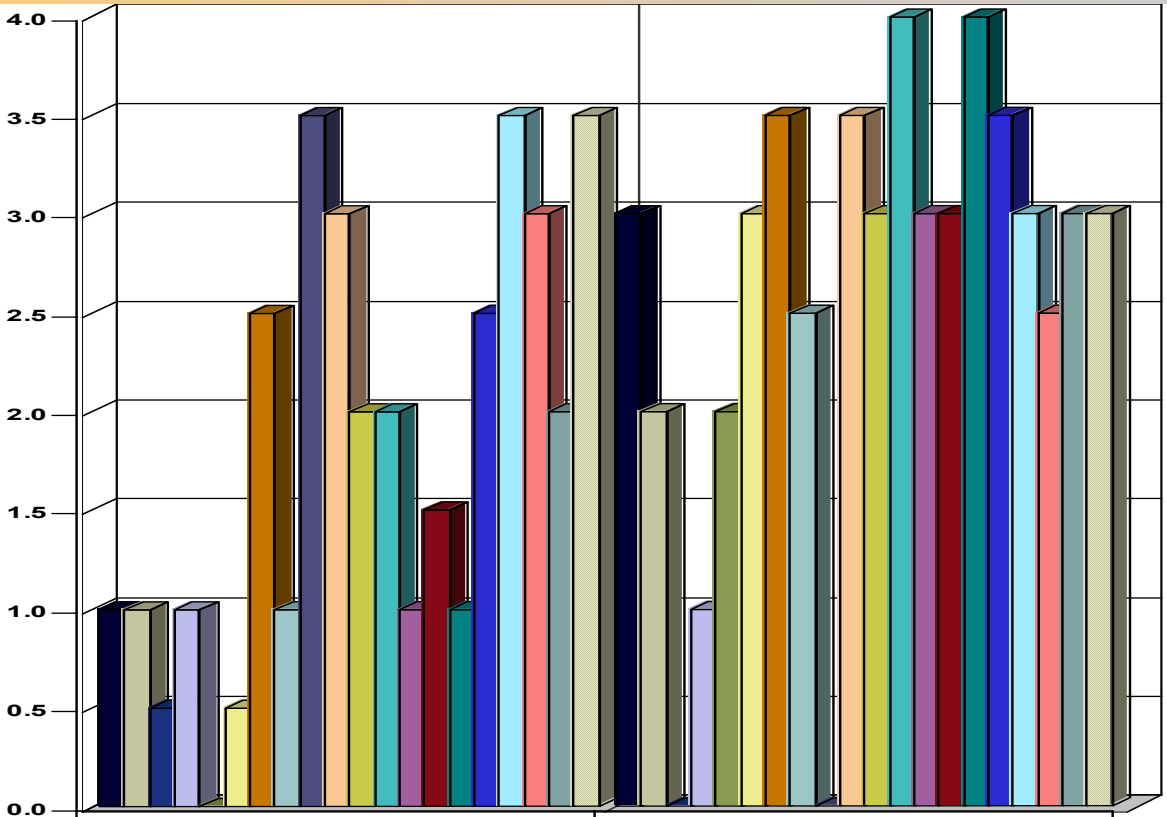
Methods of Analysis

- In June 2001,fifteen previously monitored TCPs (that included archeological features) were evaluated. The arch features were mainly roasting complexes located near or on TCPs.
- Initial baseline evaluations were also conducted at five previously unrecorded TCPs.

- Graphs, charts and tables were created to compare impacts among TCPs, and to compare impacts to features within a single TCP.
- Additionally, qualitative data gathered during the trip were analyzed and compared with data from previous monitoring trips in order to gain more comprehensive knowledge regarding the cumulative effects of natural, human and dam impacts on Hualapai cultural resources in the Colorado River Corridor.

Discussion

- Human activity along the Colorado River Corridor continues to negatively impact Hualapai TCPs, associated archeological features and ethnobotanical resources located within the traditional Hualapai lands.
- Although Glen Canyon dam cfs fluctuations impact those TCPs located nearest to the river in a variety of ways, visitor impacts are most responsible for the declining integrity of several culturally significant areas located along side canyons, natural springs, historic travel routes, terraces and benches.



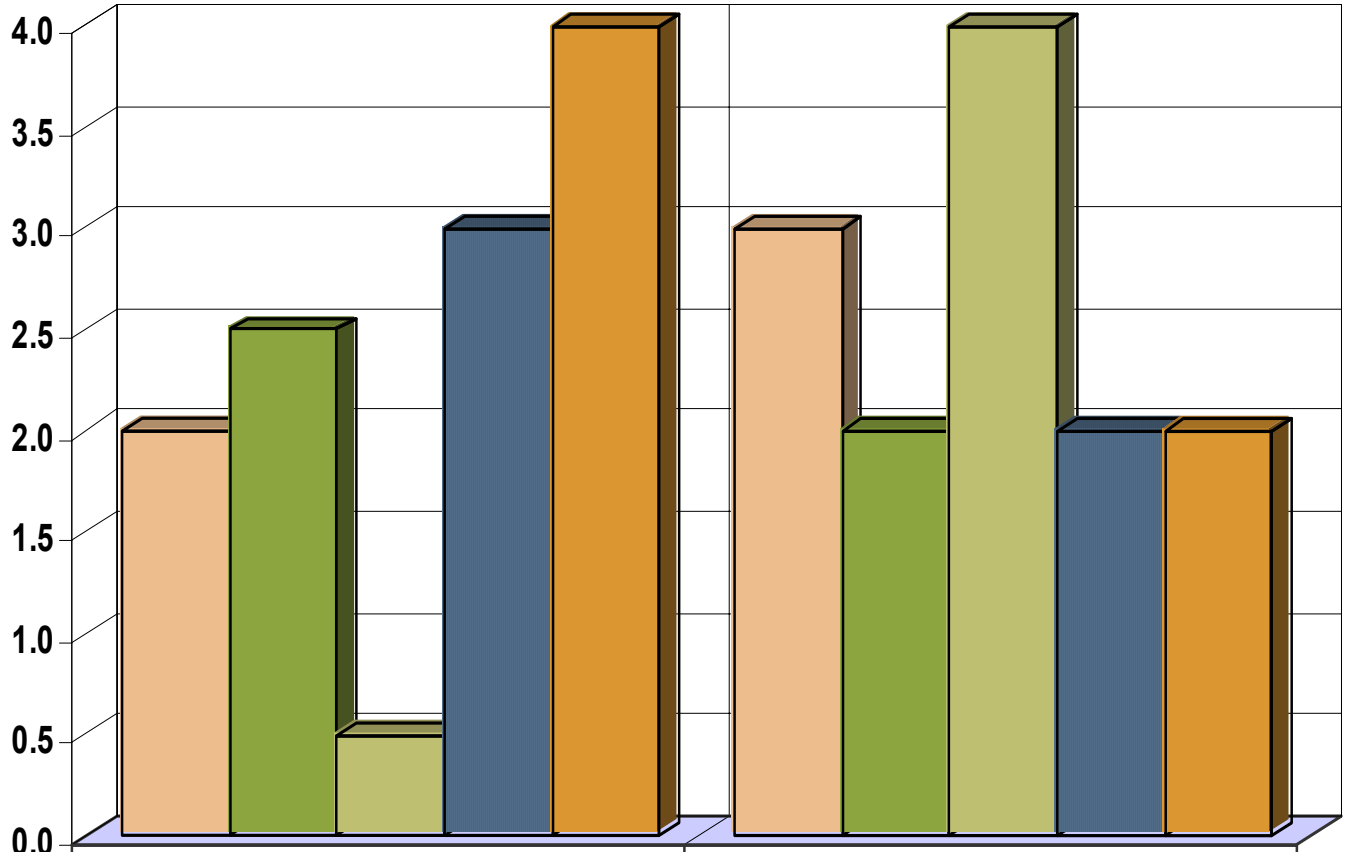
	NATURAL IMPACTS	HUMAN IMPACTS
TCP 001 - National Canyon	1.0	3.0
TCP 002 - Mohawk Canyon	1.0	2.0
TCP 003 - Vulcan's Anvil	0.5	0.0
TCP 004 - Medicine Springs	1.0	1.0
TCP 005 - Artesian Springs	0.0	2.0
TCP 006	0.5	3.0
TCP 007 - Whitmore Canyon	2.5	3.5
TCP 008 - Hematite Mine Canyon	1.0	2.5
TCP 009 - 205 Mile Canyon	3.5	0.0
TCP 010 - Granite Park	3.0	3.5
TCP 011 - Pumpkin Springs	2.0	3.0
TCP 012 - Three Springs Canyon	2.0	4.0
TCP 013	1.0	3.0
TCP 014 - Little Colorado River	1.5	3.0
TCP 015 - Cardenas	1.0	4.0
TCP 016 - Deer Creek	2.5	3.5
TCP 017 - Havasu Creek	3.5	3.0
YCP 018 - Diamond Creek	3.0	2.5
TCP 019 - Bridge Canyon	2.0	3.0
TCP 020 - Spencer Canyon	3.5	3.0

- At five of the TCPs evaluated in 2001, impacts from trailing and on-site camping were observed to be heavy to severe.
- Natural impacts such as alluvial/eolian erosion and/or deposition to TCPs seem to be most prevalent at the lower end of the Colorado River Corridor. Most of the TCPs in the lower canyon include side canyons that are large enough to be subject to occasional severe flash floods.

- Narrowing of the canyon below about river mile 140 creates a steeper gradient along the side canyons, resulting in more severe erosion and deposition from flash floods and debris flows.

- Below mile 240 variations in Glen Canyon Dam releases are coupled with fluctuations in water levels of Lake Mead, which have varied significantly through the period covered by TCP evaluations, especially at Spencer Canyon.
- The next slide shows the impacts of Glen Canyon Dam cfs* and Lake Mead elevations** on selected TCPs.

Level of Impact
(0 = absent -- 4 = severe)



	IMPACT OF WATER INUNDATION	IMPACT FROM LACK OF RECHARGE
TCP 007 - Whitmore Canyon*	2.0	3.0
TCP 010 - Granite Park*	2.5	2.0
TCP 015 - Cardenas*	0.5	4.0
TCP 019 - Bridge Canyon*	3.0	2.0
TCP 020 - Spencer Canyon**	4.0	2.0

National Canyon TCP

- At National Canyon there was rodent burrowing(observed in March, 2001) was still evident in June 2001 at an associated archaeological feature.
- Human impacts included trailing, rock carins, and trail markers to mark hiking trail.

National Canyon TCP

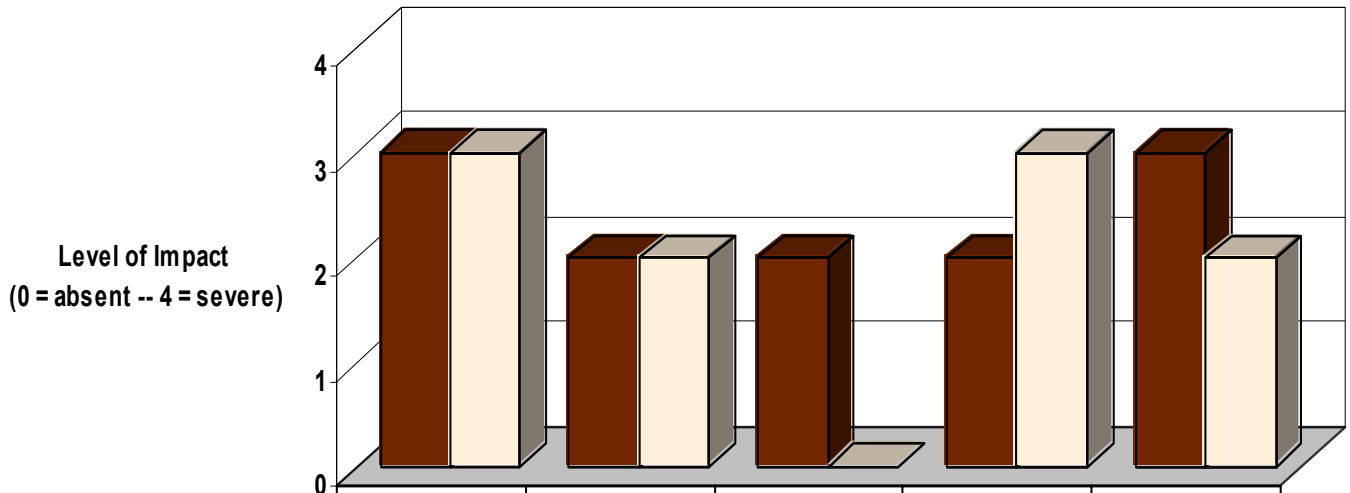
- During the 2002 monitoring, rock carins were observed along the side canyon, these rock displays were placed inside crevices of the canyon walls!!

- Granite Park consists of numerous archeological sites including rock shelters, roasting features, lithic scatters, artifacts, middens, etc. The historic Goodding Willow is also another important cultural resource.
- It was noted that the impacts of trailing in the area are increasingly severe, as visitors are bypassing NPS trail blockades and both creating new and reestablishing old trails.

Trailing to Rock Shelter – Granite Park- 2001

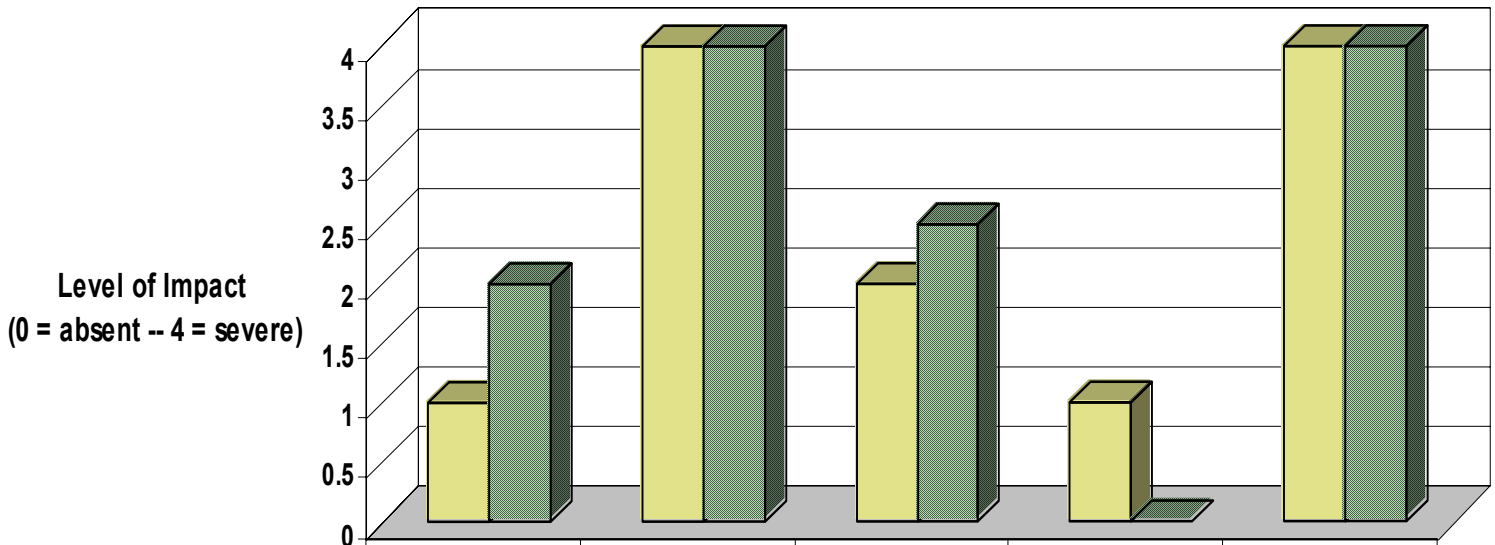
Trailing to Rock Shelter-Granite Park-2002

2001-2002 Human Impacts on Historic Goodding Willow at Granite Park.



	Trailing	On-site Camping	Impact of Water Innundation	Impact from Lack of Recharge	Boat Docking
Human Impacts 2001	3	2	2	2	3
Human Impacts 2002	3	2	0	3	2

2001-2002 Human Impacts on Ethnobotanical Resources at Granite Park.



	Clearing Vegetation	Trailing	On-site Camping	Impact of Water Innundation	Impact from Lack of Recharge
2001 Human Impacts	1	4	2	1	4
2002 Human Impacts	2	4	3	0	4

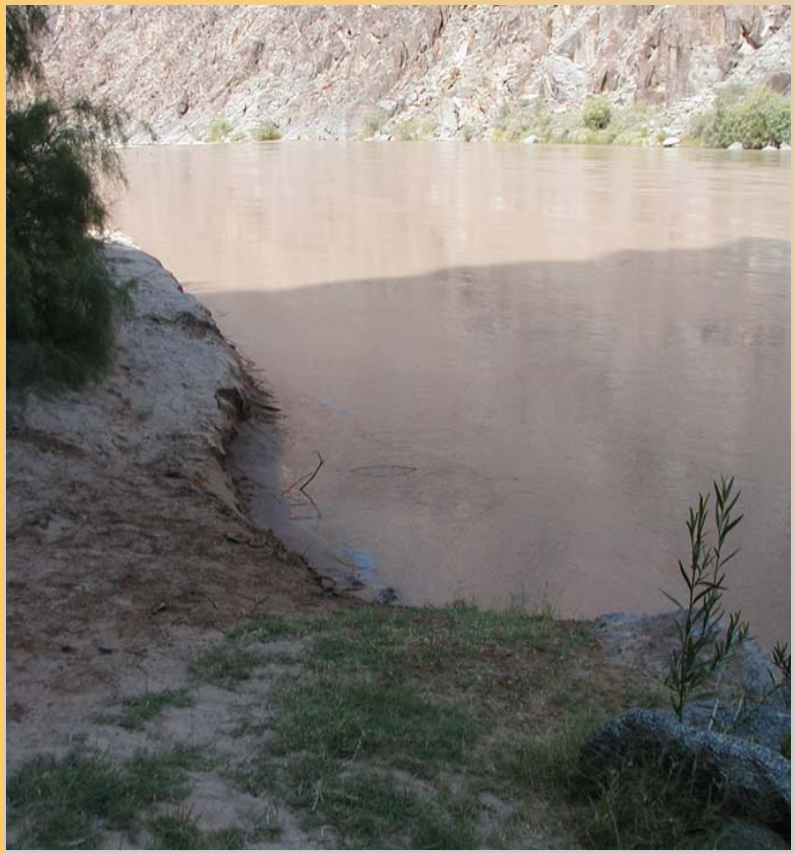
Granite Park TCP

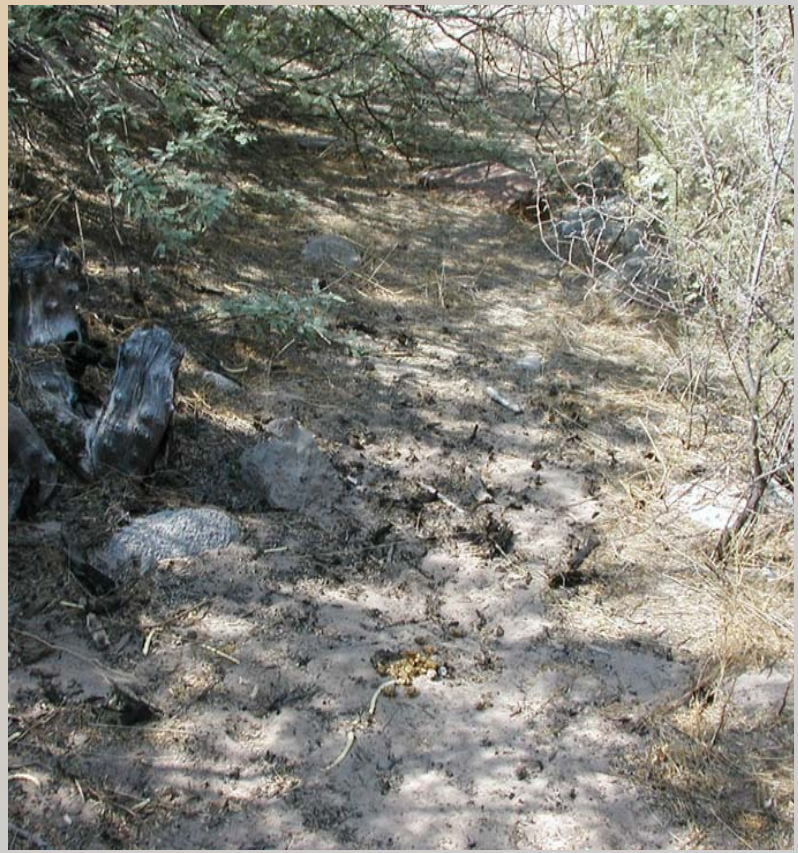
- Some of the beaches are suffering from lack of water recharge and have become choked with vegetation since 2001, including exotic Bermuda grass and camel-thorn.
- Some native species have also increased, including mesquite, arrowweed, horsetails, and seepwillow.
- The area behind the willow has not been recharged by the river since the 1996 experimental flood. The tree had enjoyed a healthy growth spurt after that event that has not been equaled since.

Diamond Creek TCP

- This TCP includes important ethnobotanical resources, archeology and is a pre-historic travel route. It is an important historical and current ethnobotanical gathering area.
- Although there has been no floods that have changed the delta since last year, the threat remains. Plants on the dune show severe drought. Moderate to heavy trailing from the boat beach to the upper beach negatively impact the dense vegetation.

The picture to the left shows bank cutting near plant transect 1, right picture shows a campfire along trail to upstream beach.



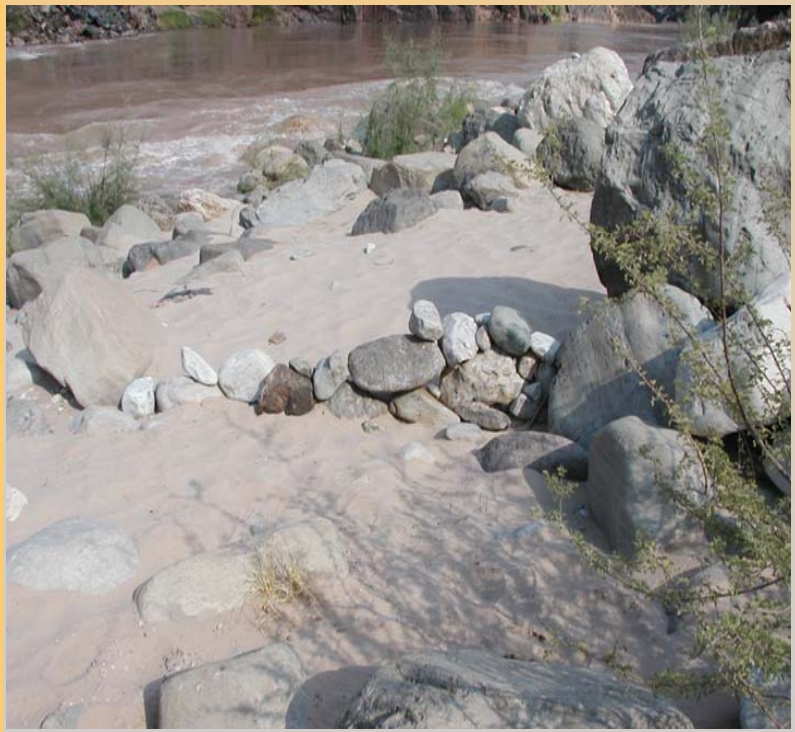


Bridge Canyon TCP

- This TCP includes important ethnobotanical resources, a side canyon perennial creek, trails and a waterfall known to have been traditionally visited by the Hualapai people. Important native plants include arrowweed, cattails, Indian tobacco, lemonade bush(Squaw-bush), and seepwillow.
- In the 2002 monitoring, gullying, scouring of vegetation and debris deposits from a severe side canyon flood were noted, however the steady low to moderate releases from the Glen Canyon Dam have maintained the sand along the beach.

Left photo shows gullying, scouring of vegetation. Right photo is of debris deposits.

Human impacts on the TCP were noted to be heavy. A rock wall was observed along the middle beach, and trailing and camping areas along the middle beach were marked with rock aliments. Also carins were noted along the mouth of the canyon.



Spencer Canyon TCP

- The human impacts to this TCP is heavy to severe. There is heavy trailing and bank slump and erosion at the beach due to fluctuating Lake Mead levels, dam releases, and strong wakes caused by power boats going to Separation Canyon to pick up passengers.

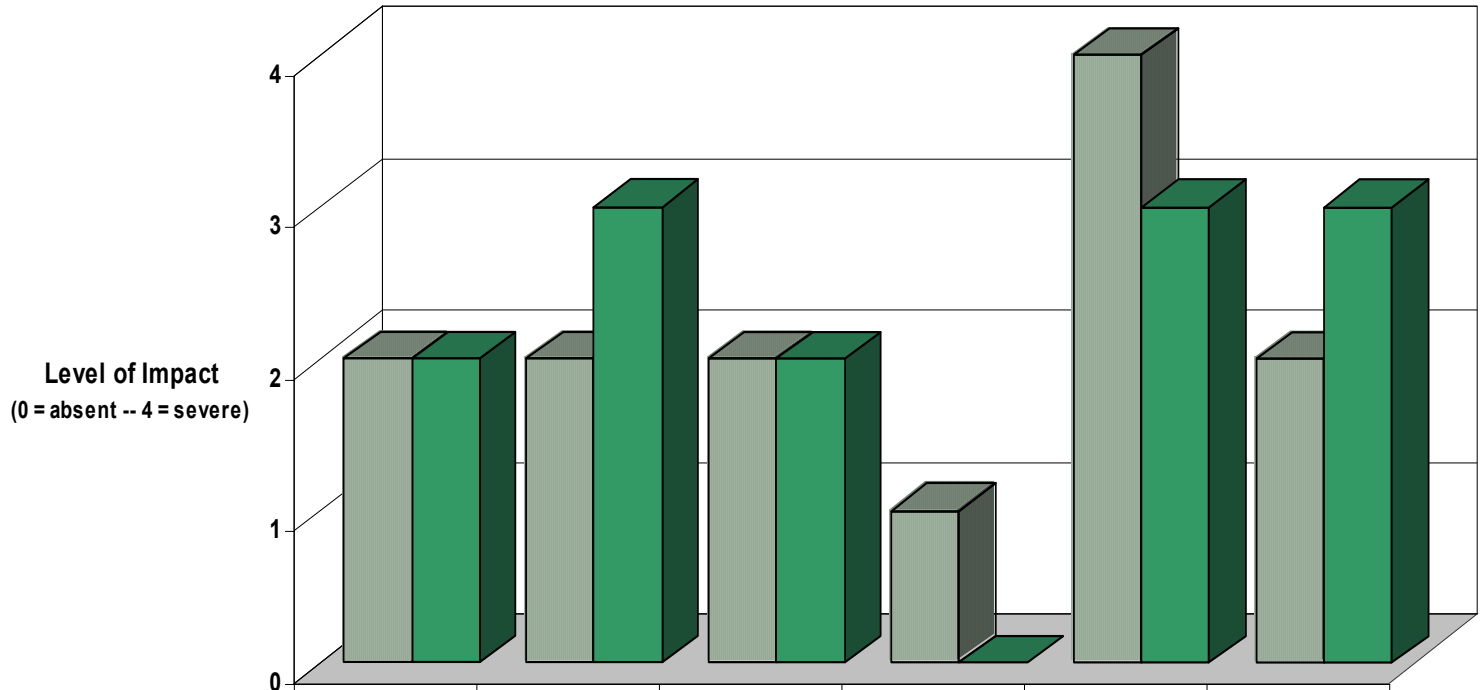
The lower beach is nearly gone and the large beaches observed in 2001 have eroded out.

- The beach exposed along the shore is very muddy, and high cfs flows have partially flooded the outer part of the delta.

Spencer Canyon TCP

- These floods that occur at Spencer can profoundly affect plants along the canyon floor. Additionally, fluctuations of Lake Mead by 5-8 feet since 1996 have alternately flooded and exposed the beach at Spencer, and sediment erosion and deposition associated with these fluctuations have caused changes in the shape of the beach.

Human and Lake Mead elevation impacts on ethnobotanical resources at Spencer Canyon TCP



	Clearing Vegetation	Trailing	On-site Camping	Picking	Impact of H2O Inundation (Lake Mead)	Impact from Lack of H2O Recharge (Lake Mead)
Human Impacts 2001	2	2	2	1	4	2
Human Impacts 2002	2	3	2	0	3	3

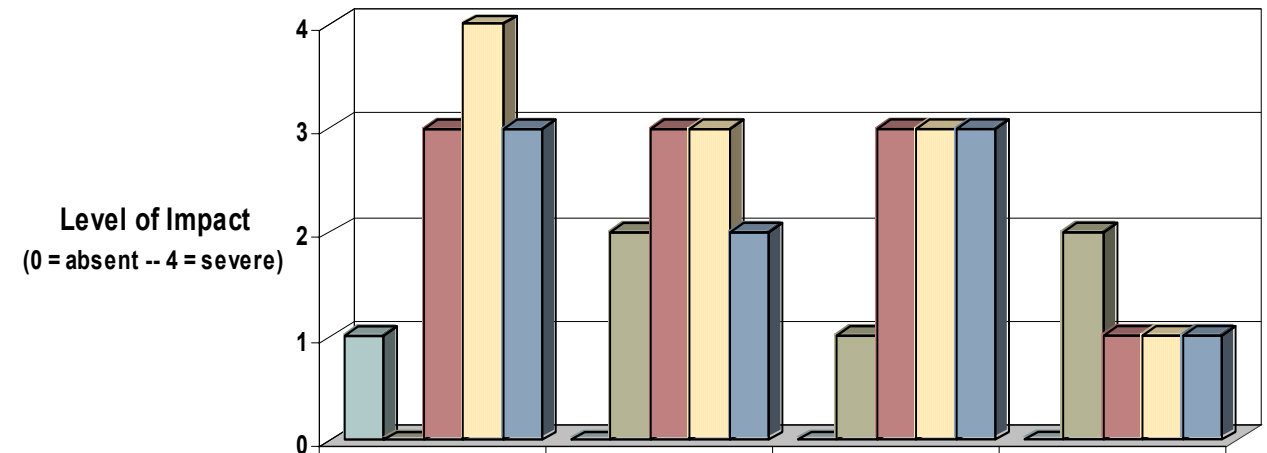
Ethnobotancial Evaluation Database Module

- Prior to the experimental flood of March 1996, baseline data was collected to evaluate the effects of the flood on ethnobotanical resources at five sites in the lower Grand Canyon.
- In 2001, all prior transect readings were entered into the database and compared with corresponding cfs data obtained from the USGS website listing daily releases from the GCD.
- The level of Lake Mead is more important than the Colorado River cfs at Spencer Canyon, and lake level is included in the analysis at that site (USBR 2002).

- Previous reports presented the changes in each plant species recorded at each TCP. After seven readings, this became cumbersome to portray and assimilate, so we summarized the data as total plant cover.
- At all TCPs, we examine three categories of plants on at least one of the transects: total plant cover, cover of culturally significant plants, and cover of riparian plants.
- The latter was included because these species, closest to the river, are most likely to be influenced by varying water releases.

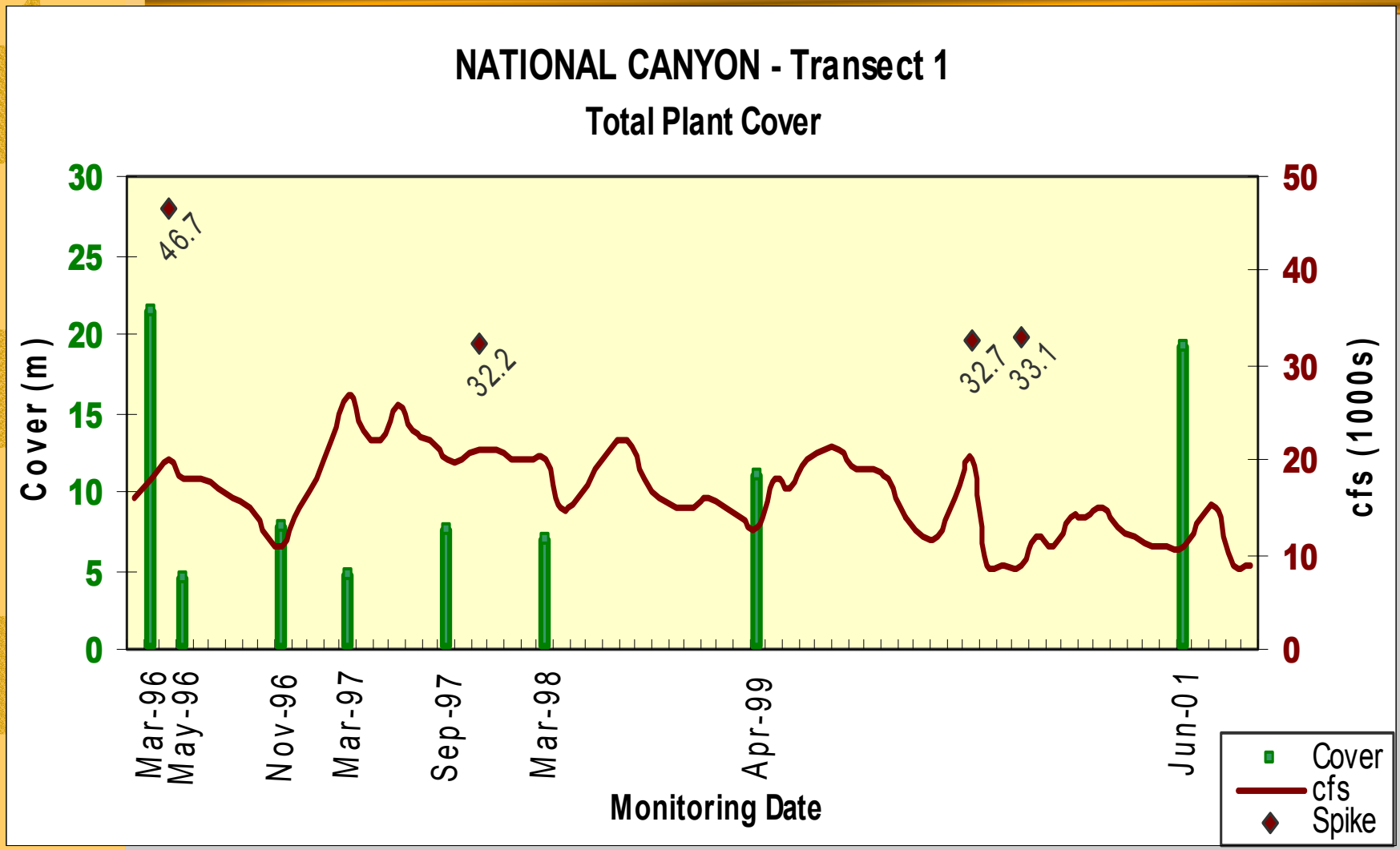
- Superimposed on bar graphs showing plant cover is a line graph of monthly average Glen Canyon Dam releases, generated from daily mean cfs for the five-year period.
- Because the amplitude is diluted by monthly summaries, we have added four experimental (spike) flows over 30,000 cfs: April 1996, November 1997, and May and August 2000. The spikes are perhaps the single most important cause of vegetation change, at least in the short term, along the river.
- Side canyon flash floods still affect many if not most of the TCPs that are located in drainages or on beaches and deltas.
- At four of the five sites we have examined for this evaluation program, flash floods have affected vegetation along the river to some degree, and the fifth site, two scouring flash floods have occurred.

Impacts of side canyon flooding/drought on plant resources at five TCP sites.

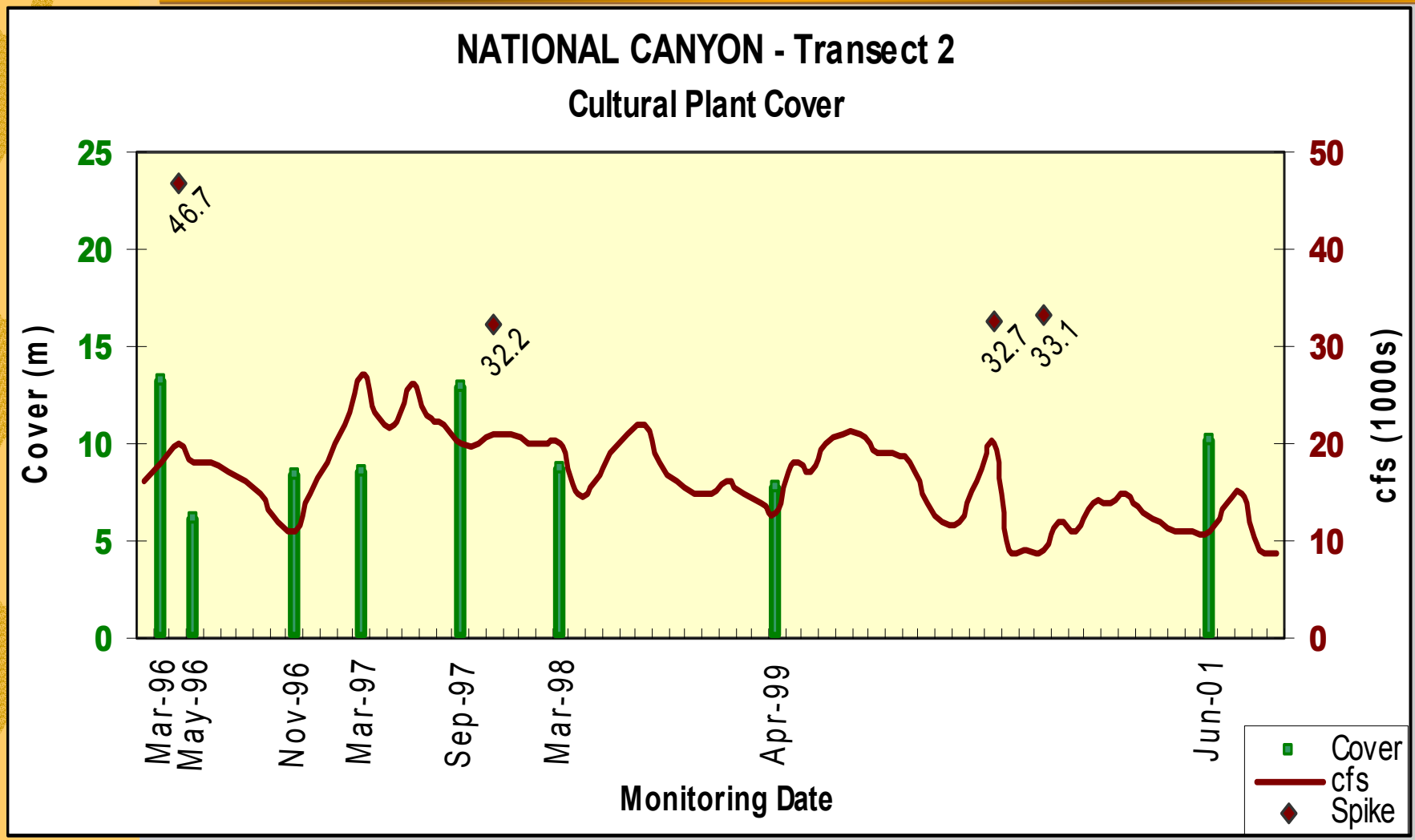


	Deposition	Erosion	Flooding	Drought
TCP 001 - National Canyon	1	0	0	0
TCP 010 - Granite Park	0	2	1	2
TCP 018 - Diamond Creek	3	3	3	1
TCP 019 - Bridge Canyon	4	3	3	1
TCP 020 - Spencer Canyon	3	2	3	1

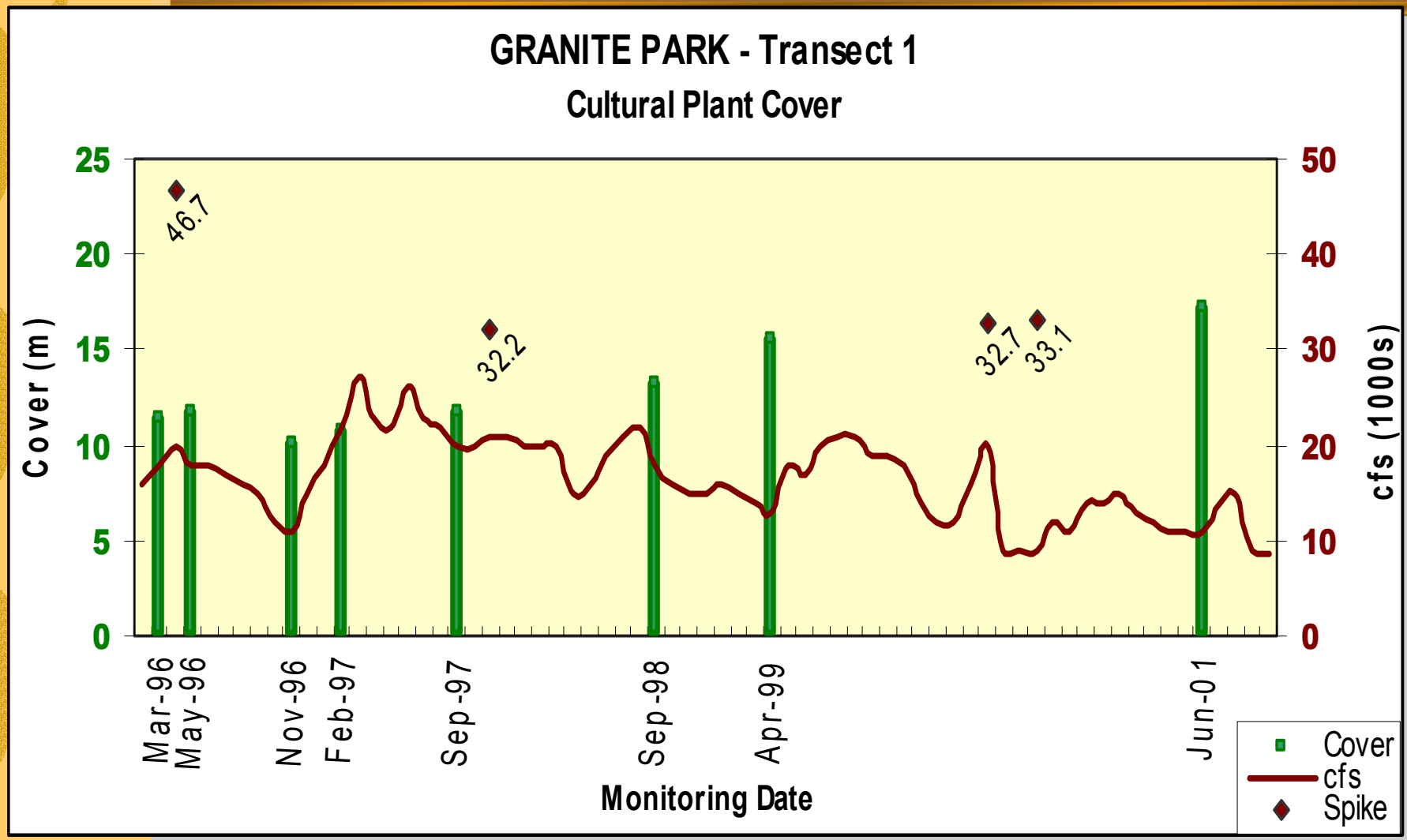
Impact of GCD cfs on plants at National Canyon TCP



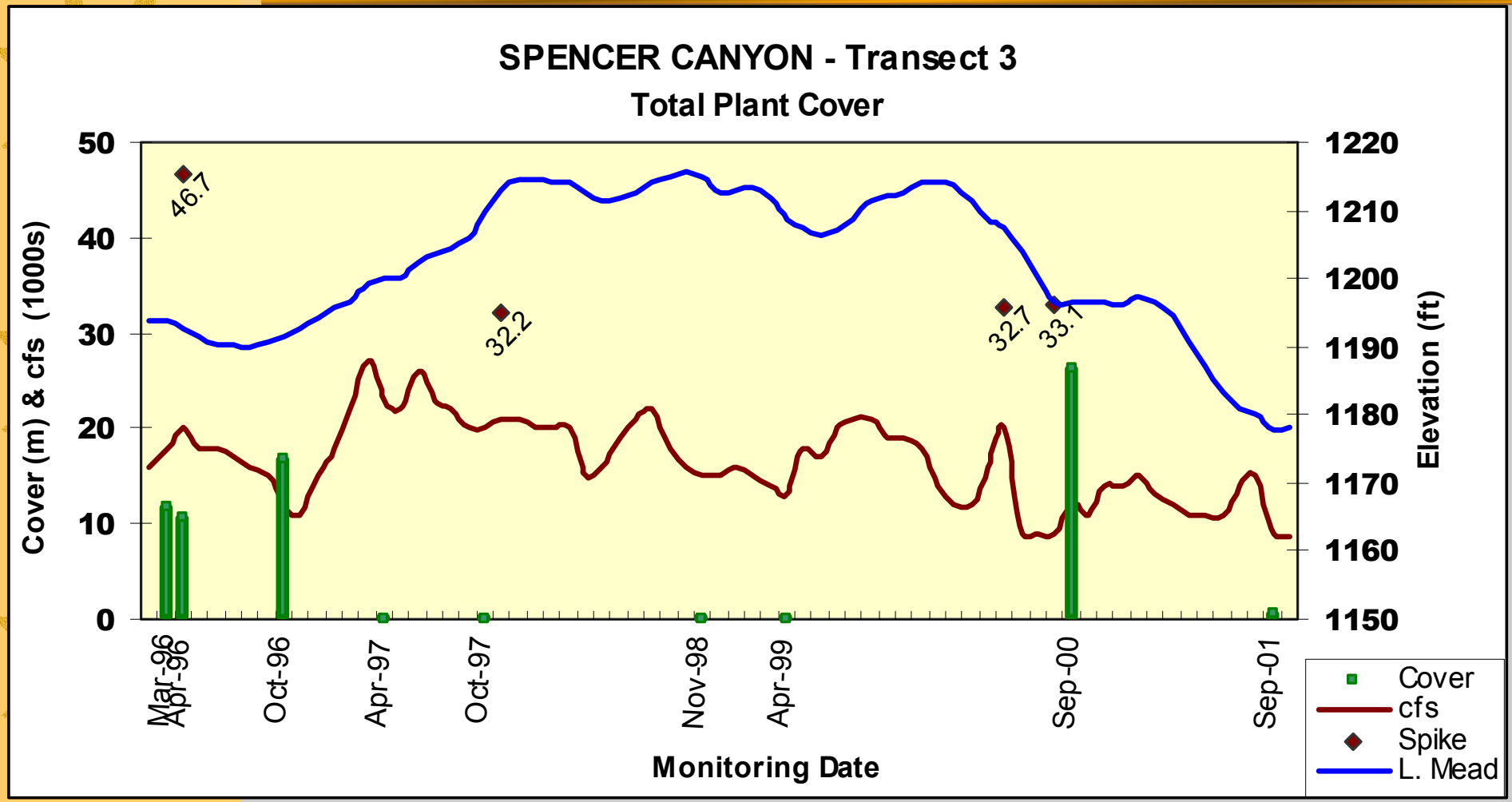
Impact of GCD cfs on culturally significant plants at National Canyon TCP



Impact of GCD cfs on culturally significant plants at Granite Park TCP



The dynamic nature of the lower Spencer delta is shown below. This graph includes lake elevations as well as river cfs and plant cover.



Recommendations

- Re-evaluations of TCPs need to be conducted annually to monitor further impacts and to obliterate any new access trails to sensitive areas in order to deter future visitations.
- The need to conduct C-14 dating of charcoal samples within a specific roasting complex at National Canyon (to maintain the integrity), in consultation and discussion with the Bureau of Reclamation and PA signatories.

- Continue development of standardized protocol that will be utilized at all sites and expand scope of elements evaluated at each site visit.
- Emphasize protocol to evaluate level of a number of natural, human, and dam impacts on TCPs as a whole with focus on its most significant elements.
- A numerical evaluation should allow the elements to be assessed and compared between years.

Conclusions

- Human impacts was the most significant factor at most sites.
- Consistent low water releases from GCD allowed shoreline marsh vegetation to increase at several sites, as shown by th ethnobotanical transects.
- Very low water levels in Lake Mead exposed new beach areas, but this was negated by bank erosion, probably associated with power boats.
- The most important natural impact at most sites continues to be side-canyon flash-flooding, noted during 2002 monitoring at Bridge Canyon.

- Hualapai Tribe intends to participate actively in the evaluation of Traditional Cultural Resources in relation to the effects of proposed experimental flows tentatively scheduled for 2003.
- TCP evaluations carried out in August 2002 will serve as a baseline for evaluating the effects of the BHBF on Hualapai TCP sites.
- Initiate consultations with tribal elders regarding the 2002 report, yet to be finalized, and solicit their concerns and issues of these resources.
- Incorporate up-dated tribal views and concerns into protocols for in-field monitoring.

Prepared by

- Hualapai Tribe, Dept. of Cultural Resources
- PI - Loretta Jackson
- Botantist - Arthur Phillips,III
- Anthropologist - Debra Kennedy