

Panel Recommendations	Reference to Protocol Review Report	GCMRC Action	FY Period	Present Status and Future Needs	Est. Costs
System wide 3-D oblique Photogrammetric Techniques	1A iv, v	Review and establish techniques	98-2000	Funded NAU research	\$40,000
Explore the use of Digital Softcopy	1A vi	Review and establish techniques	98-99	Funding for Utah State Research	\$40,000
Vertical Aerial Photography to monitor terrace stability	1 B ii, 2 iv	Initiated evaluation of techniques Investigate LIDAR an application to biomass calculations	98-2002	Funding for aerial mapping of cultural resource sites, purchase photography and mapping, (Horizons, Inc. / Earth Data)	\$75,000
Color infrared and Color aerial photography	1 B iii	Initiated evaluation of FY 98 fall overflight	98-99	Funded flights for Color IR and Color photography	\$35,000
Review in-house airphotos for archeological sites	1 B iv	Initiated FY 98	98-99	Working with Pat Chavez, USGS	\$25,000
System wide changes in Riparian vegetation	1 C iii, v 1 D ii	Initiated in FY 98, fall flights over Glen Canyon reach	98-99	Funded flights for Color IR and Color photography, FY 99 HYDICE flight	\$106,000
Explore long wave radar	1 D iii	Investigate	2000-02	In house research on feasibility	\$90,000
Test multi-spectral/hyper spectral sensors for reach aquatic productivity and episodic inputs	1 E ii 1 G ii, 1 H iii, iv 2 v	Initiated HYDICE, investigating other sensors	99-2002	Purchase software and hardware Working with Pat Chavez	\$40,000
Cost benefit analysis of alternative seven sensors (1)	1988 Overflight ii ii	Investigate alternative sensors (1) ability to answer M.O.s	2000-02	In-house investigation and report on alternative sensors	\$400,000
Changes in backwater habitat	1 F ii	Initiated review for FY 98 fall overflight	99-2000	Work with Earth Data and ASU (In-house training on FY 98 data set)	\$5,000
Episodic input of sediments	1 G i, ii General Comments	Develop GIS soils inventory and model	99-2001	Gather existing soils information and fund model development	\$60,000
Develop relationships with chlorophyll concentrations and hyper/multi-spectral imaging	1 H v	Provide RFP	99-2001	Develop cost and sensor techniques	\$50,000
Synthesize sediment source areas and GIS coverages	1 I i, ii	Gather related digital data	99	Upgrade software and hardware Purchase "The Colorado River Basin Atlas"	\$10,000
Develop system-wide GIS (base coverage)	1 K i	Implement GIS coverage	99-2002	Develop GIS for Colorado System and Fund base mapping effort	\$150,000
Convert Vector topographic maps to DEMs	1 K iv	Work with Park Service and perform in-house conversion	99-2000	Develop GIS coverage and models	\$35,000
Establish system wide data base of ground control	1 L iii General Comments	In-house implementation (on-going)	98-2000	Develop dynamic links within GIS	\$25,000
KAS digital color infrared images	1 L (ES) i	Develop techniques	99-2000	Fund research	\$45,000
Southwestern Willow Flycatcher	1 L (ES) ii	see 1 K i & Overflight	2000-02	Fund RFPs	\$50,000
Explore alternative films and filters	1988 Overflight I	Initiate investigation w/ Horizons	99	Review and evaluate past photos	\$5,000
Determine required turn-around times for image processing	4 i Comments	Investigate Researchers required turn-around times	98-99	In-house survey	\$1,000
Analyze existing airphotos	Image analysis vi	Assess needs and conduct eval. for ability to answer M.O.s	99	Purchase Software, hardware and digital images	\$80,000
Determine optimum spatial resolution and MO needs	3 viii	Cost evaluation of available sensors (assuming data sets are available)	99-2002	Conduct investigation of sensor application, determine needs	\$30,000
Investigate hand-held or simple mount digital photography	3 iv, v, vi, vii	Cost benefit analysis of available digital sensors	99	Conduct investigation of sensor application, determine needs	\$30,000
Lake Powell, explore applications of Hyperspectral images and other platforms	Lake Powell	Review platforms for applicability and perform research to develop relationships	2000-02	Fund image purchase and RFPs Consult w/ Pat Chavez	\$150,000
Investigate Satellites	2 vi, vii	Review satellites (2)	2000-02	In house investigation	\$100,000

(1) HYDICE, ATLAS, ADAR, Flight Landata Systems, CAMIS, US DOE MBB BO-105, ONR, JPL

(2) IRS-1C, EarlyBird, QuickBird, OrbView

FY 2000-2002 Total: \$1,877,000