

QUARTERLY PROGRAMMATIC REPORT

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CALFED Project # 98-C15 (B81738)
Quarter Ending: June 30, 1999

Deliverables

NOTE: The 98-C15 agreement was not fully executed until April, 1999.

<u>Deliverable</u>	<u>Due Date</u>	<u>% Complete</u>	<u>Date Deliverable Complete</u>
Task 1 (Report on temp. tol., tendencies, swim perf., metab. rate, bl. equilib., eval. for managem.)	1-30-00	10	
Task 2 (Report on GS reprod. characteristics, including age-specific devel. & gamete charac's.)	1-30-00	10	
Task 3 (Report on GS' baseline reproductive & stress hormone profiles.)	1-30-00	10	
Task 4 (Report on GS genetic diversity & sturgeon genetic markers.)	1-30-00	10	
Task 5 (Report on GS egg, larval, and adult distributions & abund.; infl. of abiotic factors.)	1-30-00	10	
Task 6 (Develop Biological Monitoring/Research Plan, incorporating a Quality Assurance Plan)	4-15-99	100	
Task 7 (Quarterly fiscal and programmatic reports by the end of the quarter.)	1-30-00	25	<i>Deliverable 1 7/15/99</i>

Narrative

Task 1: GS Temperature Tolerance Limits and Behavioral Tendencies, Swim. Performance (J.J. Cech, UC Davis, Task Leader)

Fourteen adult/subadult green sturgeon (GS) were collected by CDFG (See Task 5) and held at UC Davis for upcoming metabolism and blood-oxygen equilibria measurements. Six, acrylic flow-through respirometers were designed and constructed for these large fish. Testing of respirometers is now underway. Young-of-the-year (YOY) GS were spawned from Klamath River-collected broodstock GS in May, 1999, in cooperation with the Yurok Tribe (see Tasks 2, 3, 4). YOY GS are being raised for upcoming metabolism, temperature tolerance, dissolved oxygen tolerance, behavioral tendencies, and swimming performance measurements.

Task 2: Reproductive Characteristics of Wild GS (S.I. Doroshov, UC Davis, Task Leader)

Body size data, samples of gonads and fin rays have been collected from about thirty adult green sturgeon from the Klamath River. Histological processing of gonad samples and aging of the fin ray sections will be completed this summer. Due to the seasonality of the sturgeon spawning migration and the predicted lack of available wild caught eggs and larvae during spring 1999, two 4'x4'x7' cages were constructed at UC Davis and transported to the Klamath River for use in holding and spawning broodstock. Our Native American collaborators gill netted broodstock males and females and held them in the cages. Five adult males (weighing from 23 to 53 kg) were successfully induced to spermiate and two adult females (38 and 48 kg) were induced to ovulate on May 20. Total number of eggs collected from female 1 and female 2, was 52,147 and 81,606, respectively. The fertilized eggs were transported to UC Davis and incubated in MacDonald jars until hatching. Fertility was 25% and 41% and a total of 17,000 larvae were hatched. Fixed samples of embryos and larvae will be described and photographed this summer and fall. We are currently rearing larvae on two diet treatments; a trout semi-moist diet only and the other treatment receives the same diet and is supplemented with live *Tubifex* worms in the morning and afternoon. We will continue to monitor growth and survival through the summer and fall.

Task 3: Assessment of Stress and Its Impact on Reproduction (G.P. Moberg, Task Leader)

To determine the impact of environmental stressors on GS fingerling development, it is necessary to determine the age when developing larvae and/or fingerlings are capable of expressing a stress response, as determined by increased synthesis of cortisol. GS larvae hatched from eggs collected on the Klamath River (see Task 2) were tested for responsiveness to a single acute stressor of air emersion for 45 seconds during development. At varying times from just before the stressor until 2 hours post-stress, groups of fish were sacrificed in MS222 and frozen for subsequent cortisol determinations. We currently are conducting cortisol analysis on the samples. We will continue to monitor the development of the stress response in the maturing GS fingerlings. In subsequent testing we will begin to evaluate the accumulative effects of multiple stressors. Due to project funding delays, Task 3 GS projects were initiated on another budget. Because of this circumstance, none of the Task 3 monies have been expended to date.

Task 4: Genetic Analysis (B.P. May, Task Leader)

This task had two objectives, (1) to develop species-specific genetic markers for GS and white sturgeon (WS) and (2) to develop intraspecific nuclear genetic markers that could be used in a Phase 2 study to differentiate GS populations. The first objective is following two approaches. An mtDNA marker was developed that uses an Ssp I restriction site presence in cytochrome B in GS that is absent in WS. Amplification and subsequent digestion with Ssp I yields a single band in WS and two smaller bands in GS. Secondly, amplified fragment length polymorphisms (AFLPs) were examined in GS and WS that showed numerous fixed differences between these species. Several of these bands were cut out of gels and sequenced. Primers were developed for one of these differences that shows a seven-base pair deletion in GS versus WS DNA. We are now in a position to determine the identity of any sized sturgeon, e.g. fry. Insufficient intraspecific differences were seen in AFLPs in GS to justify pursuing our second objective with AFLPs. Therefore, we have concentrated on the development of highly polymorphic microsatellite markers for GS. We have been redesigning primers we developed for other sturgeon species to work in GS. We have about six loci that should prove useful for population differentiation.

analysis in Phase II, and we will continue to develop these markers during Phase I.

Task 5: Determination of GS Spawning Habitats and Their Environmental Conditions (R.G. Schaffter and D.W. Kohlhorst, CDFG, Task Leaders)

Due to project funding delays, the first field season for GS egg and larval sampling in the Feather River was missed. Because of this circumstance, none of the Task 5 monies have been expended to date. However, 14 adults and subadult GS were captured for UC Davis studies (see Task 1) from sturgeon sampling efforts in San Pablo Bay during the fall. Sampling for juvenile and adult GS continues. Finally, field gear is being staged and personnel scheduled for the upcoming Feather River egg and larval sampling effort in spring, 2000.

Task 6: Biological Monitoring/Research and Quality Assurance Plan (J.J. Cech, Task Leader)

Plan is attached to this report.

Task 7: Quarterly Fiscal and Programmatic Reports (J.J. Cech, Task Leader)

This is the first of four quarterly reports.

Projected Expenses for the Next Three Months:

Following is an estimate of costs for the next three months (July - September, 1999)

Month 1: \$16,668 Month 2: \$16,668 Month 3: \$16,668 Total for Quarter: \$50,004

Summary of Expenses to Date (first 5 months of Phase 1):

Task	Q. Budg.	Q.Expen.	Q. Var.	Ph.Budg.	Ph.Expen	Balance	Explan.
Task1	12555	15127	-2572	30140	15127	15013	Start-up
Task 2	21320	15000	6320	51169	15000	36114	Start-up
Task 3	12683	0	12683	30430	0	30430	Start-up
Task 4	10868	15836	-4968	43471	15836	27635	Start-up
Task 5	18262	0	18262	43829	0	43829	Start-up
Task 6	271	0	271	650	0	650	Start-up
Task 7	135		135	325	0	325	Start-up